Metals Review

VOLUME XX ◆◆ No. 9 SEPTEMBER 1947

NATIONAL METAL CONGRESS ISSUE

Alfred Lindley Boegehold

President of the American Society for Metals

. . . Extends a cordial invitation to all members of the cooperating societies and other technical organizations to visit the 29th National Metal Congress and Exposition in Chicago, Oct. 18 through 24, 1947. Complete details of the program and events are given in these pages. Read them carefully, decide what days will be best for you to attend, and then pass this copy on to someone who may be interested. . . .

Featuring

29th National Metal Congress and Exposition

A brief summary of the seven-acre exhibit at the International Amphitheatre, of the 52 technical sessions at four hotels, and of the scores of other special events scheduled for Chicago the week of Oct. 18 through 24. Followed by tabulated programs of the four cooperating societies.

Notables at the Metal Show

Sketches of some of the important personalities who will receive awards and honors, or present special lectures.

Product Guide to Metal Exposition

A classified list of exhibitors under 11 general headings, with brief descriptions of specific products being displayed.

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Metals Review

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FOR *YOUR* METALLURGICAL LIBRARY

● **ACID ELECTRIC FURNACE STEEL MAKING PRACTICE . . .** by Conrad C. Wissmann

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AMERICAN SOCIETY FOR METALS

7301 EUCLID AVENUE CLEVELAND 3, OHIO

29th National Metal Congress and Exposition

A Brief Summary of the Seven-Acre Exhibit at the International Amphitheatre, of the 52 Technical Sessions at Four Hotels, and of the Scores of Other Special Events That Will Attract the Metallurgical Elite to Chicago the Week of Oct. 18 Through 24

WITH CHICAGO, the industrial crossroads of the nation, as its 1947 location, the National Metal Congress and Exposition will open for the 29th time on Oct. 18 in an ideal setting. Centrally placed with respect to both industry and transportation, the congress will bring together a cross-section of the country's leading executives, researchers and engineers in the metallurgical field, as well as the important buyers and sellers of metal products, processes and equipment.

For the National Metal Exposition, Chicago's International Amphitheatre provides one of the largest and best-equipped exposition halls in the country. There, in October, 375 firms will display and operate metalworking equipment and products that run the gamut from towering blast cleaning machines, massive presses and roaring furnaces to small and intricately shaped precision castings, tiny metal clips and fasteners, and delicate equipment for testing and inspection of metal parts.

All of the important fields embracing the metal industry will be represented as indicated by the classified list of exhibitors starting on page 35. (An alphabetical list starts on page 23.)

The National Metal Exposition will open at 12:00 noon on Saturday, Oct. 18, and will continue for a full week through Friday, Oct. 24 — the first time that the Metal Show has been held longer than five days. This early opening on Saturday and Sunday is designed to accommodate the large number of engineers and technical men in the Chicago area before the influx of out-of-town visitors on Monday.

The exhibits will be open from noon to 10:30 p. m. on the first five days, Saturday through Wednesday, and from 10:00 a. m. to 6:00 p. m. on Thursday and Friday, Oct. 23 and 24.

COOPERATING SOCIETIES

Chicago likewise provides ample hotel accommodations for the 40,000 expected visitors and for the numerous technical sessions, special meetings, luncheons and dinners sponsored by the four cooperating societies in the National Metal Congress. In addition to the technical sessions of the American Society for Metals (sponsor of the Congress and Exposition), the American Welding Society and the Metals Divisions of the American Institute of Mining and Metallurgical Engineers will meet for the 20th consecutive year in conjunction with the Metal Congress. The fourth cooperating society is the American Industrial Radium and X-Ray Society, which first met with the Metal Congress in 1944 shortly after its organization. Complete programs of these societies are given on pages 9, 11, 13 and 15.

A.S.M. TECHNICAL PROGRAM

In an effort to concentrate its program to a manageable scope, the Publications Committee of the American Society for Metals this year strictly limited the number of papers to be presented. On only one day (Tuesday morning) will two meetings be in session simultaneously, thereby giving visitors a better opportunity to hear all of the papers they are interested in. Sessions will be held in both the Palmer House and the International Amphitheatre during the Exposition hours. Heat treating (practical and theoretical) metals for high or low temperature service, light metal alloys will receive emphasis.

Another feature of the A.S.M. program will be two special lecture courses. "Introductory Physical Metallurgy" is the subject of a course of four lectures to be presented by C. W. Mason of Cornell University, and "Copper and Copper Alloys" is the subject of three lectures by O. W. Ellis of Ontario Research Foundation.

These 11 regular technical sessions and lecture courses will be supplemented by a Wednesday evening meeting at the Palmer House on "Atomic Energy". It is anticipated that John Chipman, head of metallurgical dept. of M.I.T., will discuss "Uranium and the other fissionable metals", Walter H. Zinn, director of the Argonne National Laboratory (Chicago) of the U. S. Atomic Energy Commission, will describe the post-war developments of the atomic energy program in relation to power and other peacetime uses, while E. U. Condon, director of the National Bureau of Standards, will outline the American proposals before the U. N. for the international control of atomic energy, a matter in whose formulation he had a direct hand.

The A.S.M. annual meeting will be held Wednesday morning, Oct. 22. Following installation of new national officers and presentation of annual reports, the Campbell Memorial Lecture will be presented by A. B. Kinzel, vice-president of Electro Metallurgical Co. The society's annual banquet is scheduled for Thursday evening at the Palmer House, and will be featured by awards of various medals and honors. The complete A.S.M. program, with titles and speakers, appears on page 9.

The October preconvention issue of *Metal Progress* will combine a survey of Chicago industries with a historical review of metallurgical developments since 1917. It will thus commemorate the 30th anniversary of the formation of the Chicago Chapter of the American Society for Metals (then known as the American Steel Treaters Society), and at the same time will highlight metallurgical progress in the Chicago region.

SEMINAR ON METAL FRACTURE

The American Society for Metals is also cooperating with Case Institute of Technology to present a Seminar on "Fundamental Relations in the Fracturing of Metals." It will consist of a series of six panel discussion meetings to be presented at the Palmer House on Saturday and Sunday, Oct. 18 and 19, and will include an informal dinner on Sunday. The program is given in detail on page 15.

WELDING SOCIETY PROGRAM

Looming large both in extent and importance are the technical sessions of the American Welding Society, which holds its 28th annual meeting at Hotel Sherman in conjunction with the Metal Congress. A total of 70 papers covering 16 classifications of welding applications and research will be presented in 20 technical sessions.

Highlights of the six-day meeting will be President L. W. Delhi's reception on Sunday evening, Oct. 19; the Adams Lecture by G. S. Mikhalapov, manager, apparatus research, Air Reduction Sales Co., and the awards of prizes and medals on Monday evening; the University Research Conference Tuesday evening; the Section Conference on Wed-

(Turn to page 7)

A.S.M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received in the Library of Battelle Memorial Institute, Columbus, Ohio, During the Past Month.

1 ORES & RAW MATERIALS Production; Beneficiation

1-84. Sintering Machines for the Iron and Steel Industry. W. J. Urban. *Blast Furnace and Steel Plant*, v. 35, July 1947, p. 809-812.

Some of the equipment which has been used and present development trends.

1-85. Hydrometallurgical Treatment of Alluvial Nickel Ore by an Ammoniacal Method. D. P. Gobatsky and A. S. Semenova. *Journal of Applied Chemistry (U.S.S.R.)*, v. 20, no. 1 and 2, 1947, p. 89-96. (In Russian.)

The second stage of the process, i.e., the leaching out of the reduced nickel by means of ammoniacal reagents, was investigated on a commercial scale.

1-86. The Phenomenon of Accommodation of Magnetic Permeability of Magnetite. A. M. Vinchina and others. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 129-142. (In Russian.)

Accommodation and disaccommodation of magnetic permeability of magnetite from different deposits. The influence of temperature, magnetic field, and other factors on this phenomenon. 12 ref.

1-87. The Dressing of Tungsten Minerals. (Concluded.) F. B. Michell. *Mine & Quarry Engineering*, v. 13, July 1947, p. 204-210.

Flow sheets for scheelite ores; all-gravity flow sheets; all-gravity plants followed by roasting and magnetic separation; flow sheets embodying a combination of gravity concentration and flotation; all-flotation flow sheets; dressing of complex tungsten ores. 15 ref.

1-88. Ore Dressing Investigations. Joint Investigations of the Council for Scientific and Industrial Research and the University of Melbourne. *Metallurgical Laboratory, University of Melbourne, Melbourne, Australia, Investigation No. 294, 301, 305, 308, 309, 312, 315, 316, and 317*, Jan. 30, 1946 to Jan. 4, 1947.

Brief mimeographed reports concerning the concentration of gold ores.

1-89. Metallurgical Research Program of the Bureau of Mines Relating to the Nonferrous Metals. R. S. Dean and B. Silkes. *Bureau of Mines Report of Investigation 4064*, May 1947, 22 p.

Bureau accomplishments in recovery of nonferrous metals from their ores by ore-dressing methods, and by roasting, smelting, electrometallurgical, and other processes.

1-90. Recovery of Alumina From Kaolin by the Lime-Soda Sinter Process. Frank J. Cservenyak. *Bureau of Mines Report of Investigations 4069*, May 1947, 59 p.

Tests in this report are restricted to sintering and leaching tests on kaolin from South Carolina, where extensive deposits were found. Results from the pilot-plant tests show that 86 to 89% of the Al_2O_3 can be recovered on the basis of 1000 tons of Al_2O_3 per day. Total production cost is estimated to be $47.96 per short ton of Al_2O_3 produced.

1-91. Sulphur Dioxide Leaching Tests on Various Western Manganese Ores. W. F. Wyman and S. F. Ravitz. *Bureau of Mines Report of Investigations 4077*, June 1947, 12 p.

Results of over 300 tests on about 80 samples from 58 deposits, made in small-scale laboratory equipment. Some were made in a batch semipilot plant on 50 to 150-lb. samples and some on a scale of several hundred pounds per day in a continuous semipilot plant.

1-92. Beneficiation of Chromite Ores From Western United States. J. V. Batty, T. F. Mitchell, R. Havens, and R. R. Wells. *Bureau of Mines Report of Investigations 4079*, June 1947, 26 p.

Results of laboratory ore-dressing studies of ten different chromite ores sampled by Bureau of Mines engineers.

1-93. Beneficiation of Oxide Tin Ores From the States of Zacatecas and Guanajuato, Mexico. W. G. Sandell, L. C. Bauerle, and K. C. Dean. *Bureau of Mines Report of Investigations 4080*, June 1947, 10 p.

Results of laboratory ore-dressing and sulphide volatilization studies on three samples of Mexican tin oxide ore.

1-94. On the Mineralogy of β-Alumina. D. S. Beliankin, V. V. Lapin and J. P. Simanov. *Comptes Rendus de l'Academie des Sciences de l'U.R.S.S.*, v. 55, no. 6, 1947, p. 525-533. ((In English.)

Investigation of a high-alumina slag revealed presence of three independent crystalline forms, one alpha and two beta. Constants are discussed and tabulated.

1-95. Some Studies in the System $AlCl_3$-$FeCl_3$-KCl-NaCl-HCl-H_2O at 25, 30 and 35°. Grant L. Miles. *Journal of the American Chemical Society*, v. 69, July 22, 1947, p. 1716-1719.

An investigation of a hydrochloric acid process for the extraction of alumina from calcined alunite.

1-96. Further Discussion in Johannesburg on Crushing and Grinding Efficiencies. *Bulletin of the Institution of Mining and Metallurgy*, July 1947, p. 29-43.

L. Ackerman presents an alternative theory of grinding; A. Clemes describes results of some investigation of grinding efficiencies; and S. R. Rabson contributes critical discussion. Also includes T. K. Prentice's reply.

1-97. Tubes Find Iron in Ore. *Electronics*, v. 20, Aug. 1947, p. 172.

An electronic detector scans broken ore on conveyer belts for tramp iron and trips the belt automatically, preventing damage to crushing mills.

1-98. Discussion on Engineering Problems in the Preparation of Ores for Blast Furnaces. D. C. Hendry. *Journal of the Iron and Steel Institute*, v. 156, July 1947, p. 415-420; discussion, p. 420-428.

Discussion of paper published in January issue.

1-99. Milling Practice at Aguilar. Wing L. Lew. *Mining and Metallurgy*, v. 28, Aug. 1947, p. 409-411.

Recovery of lead, silver, and zinc from mining operations in the Argentine Andes.

1-100. Milling Practice at the Balmat and Edwards Mills. Jay J. Burns. *Mining and Metallurgy*, v. 28, Aug. 1947, p. 395-397.

Zinc concentration practice at two mills operated by St. Joseph Lead Co. in St. Lawrence County, N. Y.

1-101. Milling Practices in Southeast Missouri. H. R. Stahl. *Mining and Metallurgy*, v. 28, Aug. 1947, p. 374-376.

Procedures and flowsheets for combined gravity and flotation concentration by St. Joseph Lead Co.

1-102. Crushing and Grinding Efficiencies. T. K. Prentice. *Journal of the Chemical, Metallurgical & Mining Society of South Africa*, v. 47, March 1947, p. 343-350.

Author's reply to discussions of paper in the Jan-Feb. 1946 issue.

1-103. The Cell and Symmetry of Pyrrhotite. M. J. Buerger. *American Mineralogist*, v. 32, July-Aug. 1947, p. 411-414.

New results disagree with the literature data. Single crystals of ferromagnetic pyrrhotite from Schneeberg, Saxony, and from Morro Velho, Brazil, were investigated by the procession method. The photographs show a hexagonal cell much larger than any hitherto proposed for either troilite or pyrrhotite.

1-104. The Use of Thoulet's Solution for Heavy Mineral Separation. Judith Weiss. *American Mineralogist*, v. 32, July-Aug. 1947, p. 475-478.

Procedures for preparation of solution, its use in separation, and for recovery of used solution. The solution consists of a mixture of HgI and KI in water. Advantages and disadvantages.

Section 1. For additional annotations indexed in other sections, see: 2-162-164; 10-137-142; 11-113; 26-106-107-123.

2 SMELTING AND REFINING

2-153. Flaking in Alloy Steels. S. W. Poole. *Iron Age*, v. 160, July 17, 1947, p. 42-46.

Fundamental causes for this condition and means by which it can be minimized. Operating data indicating heat treating cycles that have given successful results. Test methods for flakes in billets and blooms, including use of the Reflectoscope.

2-154. Low Cost Oxygen for Metallurgical Uses. Walter E. Lobo. *Iron Age*, v. 160, July 17, 1947, p. 49-55.

How equipment and techniques perfected largely for military use during the war promise to make available the necessary quantities of oxygen at costs substantially lower than present levels.

2-155. Critical Points. Mainly About Metallurgical Oxygen. *Metal Progress*, v. 52, July 1947, p. 67-70.

Growth of the oxygen business; use in blast furnaces, openhearths and electrics; type of plant to furnish oxygen for 10-furnace steel mill.

2-156. Economics of Oxygen Use in Steelmaking Furnaces. *Blast Furnace and Steel Plant*, v. 35, July 1947, p. 813-816.

Linde Air Products' tabular summary of openhearth heats using oxygen through end-burners.

2-157. The Use of Carbon in the Blast Furnace and Heat Balances. T. L. Joseph and Kurt Neustaetter. *Blast Furnace and Steel Plant*, v. 35, July 1947, p. 824-832.

Fundamental principles; functions. Gasification at and above the tuyeres; volume of blast per pound of coke; fuel consumption; effect of low grade ores; and limiting factors in furnace efficiency, hearth temperatures, or reducing power. (To be continued.)

(Turn to page 8)

Heads of Cooperating Societies

L. W. Delhi

E. A. Anderson

D. M. McCutcheon

F. B. Foley, Superintendent of Research for Midvale Co., Will Be Installed as President During the Annual Meeting on Wednesday. Mr. Delhi is president of the A.W.S., Mr. McCutcheon of the X-Ray Society, Messrs. Anderson and Washburn, chairmen, respectively, of the A.I.M.E. Institute of Metals and Iron and Steel Div.

T. S. Washburn

nesday evening; and the annual banquet on Thursday.

Supplementing the technical sessions and meetings on welding, a large segment of the National Metal Exposition will be devoted to exhibits of welding and cutting equipment and supplies. These companies are listed on page 49.

METALS DIVISIONS, A.I.M.E.

The Fall Meeting of the Metals Divisions of the American Institute of Mining and Metallurgical Engineers will occupy three days during the Congress, namely, Monday, Tuesday and Wednesday, Oct. 20 through 22. Headquarters will be at the Stevens Hotel, with registration at 8:30 a. m. on Monday, and 9:00 a. m. on Tuesday and Wednesday.

The Institute of Metals Division will open the proceedings with a session on Copper and Copper Alloys, Monday morning. The first meeting of the Iron and Steel Division will be Monday afternoon. Joint meetings of the two divisions are scheduled for Tuesday and Wednesday afternoons, with the annual dinner of the Metals Divisions on Tuesday evening at the Stevens Hotel.

RADIUM AND X-RAY PROGRAM

Following a now established custom, the young but lusty American Industrial Radium and X-Ray Society will hold its Seventh Annual Meeting and Convention during the last three days of the Metal Congress. The program will open with a technical session on Wednesday morning, Oct. 22. Four more sessions are scheduled for Wednesday afternoon, Thursday morning and Friday morning and afternoon. Thursday afternoon at 2:00 p. m., members and guests will convene for the important Lester Lecture to be presented by Leslie W. Ball of the Naval Ordnance Laboratory, Naval Gun Factory, Washington. The lecture will be followed by the annual meeting of the society.

INDUSTRIAL GAS BREAKFAST

The traditional Industrial Gas Breakfast, sponsored by the Industrial and Commercial Gas Section of the American Gas Association, will be held Wednesday morning, Oct. 22, at the Stevens Hotel. All gas men who attend the Metal Congress are cordially invited to this informal get-together with the editors of the metals trades magazines. Gerald E. Stedman, widely known writer on industrial heating subjects, will be the guest speaker.

The breakfast will be followed immediately by the fall meeting of the Midwest Industrial Gas Council, also at the Stevens Hotel. This organization is composed of industrial gas representatives and furnace equipment men from Illinois and bordering states. The program will consist of three or four talks and a noonday luncheon.

The American Gas Association will also sponsor a combined industrial gas exhibit at the Exposition in the International Amphitheatre. Twelve companies will be represented in this space, most of them listed under the heat treating classification on page 41.

LUNCHEONS

As in past years, alumni luncheons will be held by a score of technical universities. All of these luncheons will be in the Palmer House, Chicago, on Wednesday, Oct. 22. Tickets will be on sale at the registration desk and should be purchased by 1:00 p. m. on Tuesday.

The annual Canadian Luncheon is scheduled for Thursday, Oct. 23, also at the Palmer House. Six Canadian chapters of the American Society for Metals will participate, represented by visiting members from the Montreal, Ontario, Western Ontario, Ottawa Valley, Manitoba and British Columbia Chapters. Other friends of Canada are also invited.

LADIES' ENTERTAINMENT

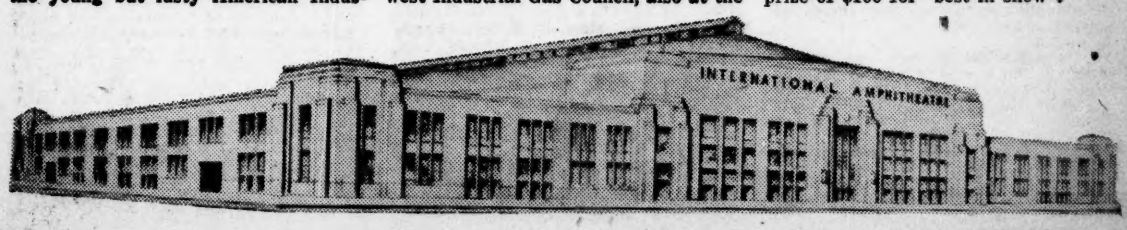
Ladies who attend the National Metal Congress but are not interested in matters metallurgical will be entertained by a special program of planned events. Registration desks for the ladies will be maintained in headquarters hotels of the cooperating societies—the Palmer House, Sherman, Stevens, and Morrison.

The daily program will include various entertainments and visits to points of interest in the city. A nominal charge will be made at time of registration for the entire week's program.

METALLOGRAPHIC EXHIBIT

In view of the great amount of interest shown in the first A.S.M. Metallographic Exhibit at the convention in Atlantic City last fall, a similar display has been planned for the National Metal Exposition this year in Chicago. A prominent area has been set aside at the International Amphitheatre for display of micrographs, and all interested metallographers are invited to submit entries. The rules are few and simple, and will be found on page 35.

Ribbons will be awarded in each of 11 classifications, together with a grand prize of $100 for "best in show".



-158. Symposium on Radiant Energy nd Gaseous Reaction. Part III. *Indus-rial Heating*, v. 14, July 1947, p. 1104, 106, 1108.

Reviews last two papers of American Institute of Chemical Engineers Symposium recently held in Pittsburgh. The operation of an experimental openhearth and radiant principles as applied to the measurement of temperature and flame characteristics. (Concluded.)

-159. Acid Electric Furnace Practice. *ndustrial Heating*, v. 14, July 1947, p. 124, 1126, 1128, 1130.

The chemistry of the acid electric furnace process by C. E. Sims, supervising metallurgist, Battelle Memorial Institute, Columbus, Ohio, which was a feature of the technical program of the Fourth Annual Electric Furnace Steel Conference of the Iron and Steel Division of the A.I.M.E. in Pittsburgh.

2-160. Ingot Mold Practice Throughout the Steel Industry. *Industrial Heating*, v. 14, July 1947, p. 1132, 1134.

Results of a survey on mold practice made throughout the steel industry as presented by L. R. Berner, Inland Steel Co., at recent conference of the National Open Hearth Steel Committee, A.I.M.E., Cincinnati.

2-161. Etude de la Desoxydation de l'Acier par Fusion dans le Vide. (Study of Deoxidation of Steel by Vacuum Smelting.) J. Thomas and L. Moreau. *Revue de Metallurgie*, v. 43, July-Aug. 1946, p. 204-207.

The vacuum causes rapid reaction of the carbon in the melt with the refractory liners. It is tentatively assumed that a similar reaction must occur with the oxides of the bath itself.

2-162. Etude sur l'Eclatement des Minerais de Fer dans le Haut Fourneau et ses Consequences. (Study of Spontaneous Fragmentation of Different Iron Ores in Blast Furnaces and Its Consequences.) M. J. Fortado. *Revue de Metallurgie*, v. 43, July-Aug. 1946, p. 219-228.

Specially designed apparatus used in investigation. Results indicate the importance of the phenomenon in iron smelting.

2-163. Reduction of Nickel Oxides by Solid Carbon in Connection With Processes of Their Dissociation. D. Bogatsky. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 105-112. (In Russian.)

Data concerning the above reaction, particularly from the theoretical point of view, are contradictory. Therefore, an investigation was conducted to determine: temperature of initiation of reduction; dependence of the kinetics of the process on its temperature and duration; and optimum conditions for practically complete reduction. 25 ref.

2-164. Reduction of Nickel Silicate Minerals by Carbon Dioxide. D. P. Bogatsky. *Journal of Applied Chemistry (U.S.S.R.)*, v. 20, no. 1 and 2, 1947, p. 81-88. (In Russian.)

Results of experiments. Data show optimum conditions.

2-165. The Theory of Continuous Ingot Casting. A. N. Tikhonov and E. G. Shvidkorsky. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 161-176. (In Russian.)

A theoretical calculation of the shape and size of the zone of crystallization dividing molten from solid metal; an analysis of the effects of various physical factors.

2-166. L'Aluminothermie. (Aluminothermy.) H. C. Gonon. *Revue de l'Aluminium*, v. 24, April 1947, p. 117-120.

The aluminothermic method of oxide reduction and its application in the production of a series of high-purity metals. Other technical applications of aluminothermy.

2-167. Zur Kenntnis der Carbide des Magnesiums. (Contribution to the Study of Magnesium Carbide.) F. Irmann and W. D. Treadwell. *Helvetica Chimica Acta*, v. 30, April 30, 1947, p. 775-777.

Magnesium carbide, unlike other earth alkali carbides, can be formed from the elements only by the action of hydrocarbons. At high temperatures free carbon is produced, decreasing the quantity of carbide to zero.

2-168. Problems in Cell Design for Electrolytic Chromium. R. R. Lloyd. *Engineering and Mining Journal*, v. 148, July 1947, p. 95-97.

Process for electrowinning of chromium, applicable to low-grade domestic ores, being developed in laboratories of U. S. Bureau of Mines.

2-169. The Use of Oxygen in the Openhearth Practice for Carbon Reduction. George V. Slottman and F. B. Lounsberry. *American Iron and Steel Institute Preprint*, 1947, 28 p.

A series of experimental heats were made using gaseous oxygen injected directly into the bath to study factors affecting the rate of decarburization. Efficiency factors were calculated for various blowing rates and bath carbon contents. Analyses were made of the oxygen content of the slag. The behavior of manganese with respect to carbon was studied in relation to its effect on the efficiency factor. An equation was derived to cover the experimental data. Tonnage increases of the order of 25% with equal or better steel quality and with an increase in yield are obtained as compared with former slag-metal practice. 18 ref.

2-170. Traitement Metallurgique des Minerais Sulfures Complexes. (Metallurgical Treatment of Complex Sulphur Containing Minerals.) Robert Fouquet. *Comptes Rendus*, v. 224, May 12, 1947, p. 1433-1444.

The finely pulverized minerals were heated in a horizontal revolving furnace. The controlled SO_2 content of the furnace atmosphere converted the metallic oxides to soluble sulphates, from which the pure metals were recovered with excellent yields.

2-171. Les Défauts du Lingot d'Acier. (Defects in Steel Ingots.) M. de Sars. *Revue de Métallurgie*, May-June 1946, p. 137-155.

The use of different furnaces and improved pouring and cooling methods to produce pure steel ingots as free of sulphur, phosphorus and oxides as possible.

2-172. Electrolytic Manganese in Stainless Steel. F. Sillers, Jr. and R. T. C. Rasmussen. *Bureau of Mines Report of Investigations 4078*, June 1947, 17 p.

The use of electrolytic manganese in the manufacture of four types of stainless steel and the new Timken 16-25-6 Alloy at Timken Roller Bearing Co. Electrolytic manganese was entirely satisfactory as a substitute for low-carbon ferromanganese.

2-173. Use of Molten Lead as Quenching Medium in Carbothermic Production of Magnesium. P. P. Zapponi and M. J. Spendlove. *Bureau of Mines Report of Investigations 4082*, June 1947, 4 p.

In small-scale exploratory tests on the use of molten lead for quenching the Mg-CO vapors formed by carbothermic reduction of MgO, approximately two thirds of the magnesium was recovered as a lead alloy containing up to 1% Mg. Use of lead as a quenching medium is promising. 12 ref.

2-174. Investigation of Bubble-Hearth Process for Production of Sponge Iron. E. P. Barrett, C. E. Wood, V. Miller, W. E. Brown, P. R. Porath, and C. Prasky. *Bureau of Mines Report of Investigations 4092*, June 1947, 15 p.

The bubble-hearth furnace for reduction of iron ore by bubbling hydrogen through it from inlets resembling the bubble caps used in fractionating towers was first described by C. F. Ramseyee in 1944. Details of the experimental furnace and test runs made with several concentrates are given. Also describes a laboratory study of the deoxidation of iron oxides fluidized in hydrogen at 550° C. It was concluded that the bubble-hearth process is not workable. Addition of 0.5% lime and 0.5% Na_2CO_3 to one of the concentrates facilitated fluidization and deoxidation in the laboratory apparatus.

2-175. Hydrogen in Steel Manufacture. C. Sykes, H. H. Burton, and C. C. Gegg. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 155-180.

Results of a number of determinations of the hydrogen content of plain carbon and alloy steels in the electric-arc and openhearth furnace, and in ingots, billets, and forgings. The experiments on semifinished products confirmed the results of previous work on steels artificially impregnated with hydrogen and indicate that ductility is reduced with hydrogen contents in excess of 2 cc. per 100 g. A study of the effects of various heat treatments on hydrogen content and susceptibility indicates that relatively high hydrogen content does not automatically lead to hairline cracks. 15 ref.

2-176. The Production of Iron and Steel With Oxygen-Enriched Blast. R. Durrer. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 253-256.

The possibility of using oxygen-enriched blast for iron-ore smelting and for steelmaking by the bessemer process with emphasis on economics. Necessary modifications of blast furnace and converter design and of current practice. The development of a combined smelting-converting process is proposed.

2-177. Electric Smelting. R. Durrer. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 257-260.

The development of electric smelting furnaces with special reference to the low-shaft furnace. Reactions taking place in electric smelting compared with those of the blast furnace. Possibilities for future development.

2-178. Possibilities for the Extended Use of Oxygen in the British Iron and Steel Industry. M. W. Thring. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 285-291.

A general discussion, including a summary of recent experimental work in Britain and elsewhere. Uses in the blast furnace, the bessemer converter, and the openhearth furnace. 13 ref.

2-179. Electric Smelting Plant at Choindez. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 293-298.

Layout and practice in a Norwegian plant. (Based on "Das Elektroroheisenwerk Choindez 1943," E. Gebrig, *Von Roll Mitteilungen*, v. 4, June 1945, p. 26-72.)

2-180. The Production of Carbon and Alloy Steels by the Side-Blown Converter Process. F. Cousans. *British Steelmaker*, v. 13, July 1947, p. 341-349.

Results of an experimental investigation. (Paper presented to Institute of British Foundrymen, June 17 to 20, 1947.)

2-181. Sur une Methode d'Obtention des Metaux. (Concerning a Method of Obtaining Metals.) Raymond Lautie and Andre Moutet. *Bulletin de la Société Chimique de France*, March-April 1947, p. 237-239.

Starting with sulphur compounds, and using calcium carbide, the majority of metals may be obtained with satisfactory yield and sufficient purity. Temperature must be adjusted to each individual case and gaseous atmospheres may often be replaced by vacuum.

2-182. Theoretical Thermal Studies of Steel Ingot Solidification. Victor Paschkis. *Transactions of American Society for Metals*, v. 38, 1947, p. 117-147; discussion, p. 147.

(Turn to page 10)

American Society for Metals Technical Program

Chicago, Oct. 20 through 24. Sessions at both Palmer House and at International Amphitheatre

Monday, Oct. 20

10:00 A. M.—Ballroom, Palmer House

The Effect of Carbon Content on the Hardenability of Boron Steels, by G. D. Rahrer and C. D. Armstrong, Carnegie-Illinois Steel Corp. (3-244)

Tempering Effects and the Mechanical Equation of State, by J. C. Fisher and C. W. MacGregor, Massachusetts Institute of Technology (18-170)

An Investigation of Tempered Chromium-Silicon Spring Steel, by H. J. Elmendorf, American Steel & Wire Co. (18-169)

2:00 P. M.—International Amphitheatre

The Induction Hardening of a Quality Controlled Iron, by C. F. Walton, Meehanite Metal Corp. and H. B. Osborn, Jr., Ohio Crankshaft Co. (18-171)

Some Factors Affecting the Induction Hardening of an Alloy Cast Iron, by J. R. Sloan and R. H. Hays, Caterpillar Tractor Co. (18-172)

A Study of the Metallurgical Characteristics of Three Induction-Hardened Steels Heated at Various Rates, by J. W. Poynter, Wright Field (18-173)

Tuesday, Oct. 21

Session I

10:00 A. M.—Ballroom, Palmer House

The Dimensional Stability of Steel—Part II—Further Experiments on Subatmospheric Transformations, by S. G. Fletcher, Latrobe Electric Steel Co., and B. L. Averbach and M. Cohen, Mass. Inst. of Tech. (18-174)

The Dimensional Stability of Steel—Part III—Decomposition of Martensite and Austenite at Room Temperature, by B. L. Averbach and M. Cohen, Massachusetts Institute of Technology, and S. G. Fletcher, Latrobe Electric Steel Co. (4-107)

Acicular Transformations in Alloy Steel, by E. A. Loria, Mellon Institute of Industrial Research (4-108)

Session II

10:00 A. M.—Red Lacquer Room, Palmer House

Beryllium in Magnesium Casting Alloys, by J. R. Burns, Wright Field (3-245)

The Heat Treatment and Properties of Some Beryllium-Nickel Alloys, by W. Lee Williams, U. S. Naval Engineering Experiment Station (18-175)

Stretching Characteristics of Aluminum Alloy Sheet, by J. M. Taub, Los Alamos Scientific Lab. (19-273)

2:00 P. M.—International Amphitheatre

The Location of Alloying Metals in White Cast Iron, by H. A. Schwartz and James Hedberg, National Malleable & Steel Castings Co. (4-109)

Graphitization of Steel at Elevated Temperatures, by A. B. Wilder and J. D. Tyson, National Tube Co. (4-110)

Abstracts of the papers listed on this page are contained in this month's issue of the A.S.M. Review of Current Metal Literature. Annotation numbers are given following each title so that the abstracts can be readily found. For instance, the designation 3-244 corresponds to the abstract with that number *on page 14.*

Concept of the Hydrogen Potential in Steam-Metal Reactions, by Carl A. Zapffe, Baltimore (4-111)

Wednesday, Oct. 22

8:00 A. M.—Palmer House

CHAPTER CHAIRMEN'S BREAKFAST

10:00 A. M.—Ballroom, Palmer House

A.S.M. ANNUAL MEETING

Edward de Mille Campbell Memorial Lecture, by A. B. Kinzel, Electro Metallurgical Co.

12:00 Noon—Palmer House

COLLEGE ALUMNI LUNCHEONS

2:00 P. M.—International Amphitheatre

Cast Heat Resistant Alloys of the 26% Cr, 20% Ni Type—I, by H. S. Avery and C. R. Wilks, American Brake Shoe Co. (3-246)

The Cobalt-Chromium J Alloy at 1350 to 1800° F, by N. J. Grant, Massachusetts Institute of Technology (3-247)

Metallography of Hot-Dipped Galvanized Coatings, by D. H. Rowland, Carnegie-Illinois Steel Corp. (11-128)

8:30 P. M.—Palmer House

ATOMIC ENERGY PROGRAM

Metallurgical Requirements of the Atomic Energy and Power Production Program (under the auspices of the Atomic Energy Commission).

Thursday, Oct. 23

10:00 A. M.—International Amphitheatre

Mechanical Properties of Metals at Low Temperatures; A Survey, by L. Seigle and R. M. Brick, University of Pennsylvania (3-248)

Influence of Metallurgical Factors on the Mechanical Properties of Steel, by S. A. Herres and C. H. Lorig, Battelle Memorial Institute (3-249)

The Fatigue Strength of Binary Ferrites, by E. Epremian, General Electric Co., and E. F. Nippes, Rensselaer Polytechnic Institute (3-250)

12:00 Noon—Palmer House

CANADIAN LUNCHEON

2:00 P. M.—International Amphitheatre

The Bend Test for Hardened High Speed Steel, by A. H. Grobe and G. A. Roberts, Vanadium-Alloys Steel Co. (9-104)

Effects of Grinding on Physical Properties of Hardened Steel Parts, by H. E. Boyer, American Bosch Corp. (20-461)

Recrystallization as a Measurement of Relative Shot Peening Intensities, by K. B. Valentine, Pontiac Motor Div., General Motors Corp. (19-274)

7:00 P. M.—Ballroom, Palmer House

A.S.M. ANNUAL BANQUET

Friday, Oct. 24

10:00 A. M.—International Amphitheatre

Macro-Segregation in Some Alloy Steel Ingots, by J. W. Spretnak, Carnegie Institute of Technology (2-193)

The Distribution of Oxygen and Nitrogen in an Alloy Steel Ingot, by C. F. Sawyer, Vanadium-Alloys Steel Co., J. W. Spretnak and G. Derge, Carnegie Institute of Technology (4-112)

Multiple Correlation Applied to Steel Plant Problems, by W. T. Rogers, National Tube Co. (11-129)

2:00 P. M.—International Amphitheatre

Detection of As-Cast Austenite Grain Size in Heat Treated Cast Alloy Steels, by E. A. Loria, Mellon Institute of Industrial Research (11-130)

The Effect of Silicon on the Properties of Cast Carbon and Carbon-Molybdenum Steels, by N. A. Ziegler, W. L. Meinhart and J. R. Goldsmith, Crane Co. (3-251)

The Effect of Homogenization on Cast Steels, by R. J. Marcotte and C. T. Eddy, Michigan College of Mining and Technology (18-176)

Two Lecture Courses

Introductory Physical Metallurgy

Four Lectures by C. W. Mason, Cornell University.

Monday and Tuesday, Oct. 20 and 21

4:15 and 8:00 P. M.; International Amphitheatre

Copper and Copper Alloys

Three Lectures by O. W. Ellis, Ontario Research Foundation.

Wednesday, Oct. 22, 4:15 and 8:00 P. M.; Thursday, Oct. 23, 4:15 P. M.; International Amphitheatre

The thermal aspects of solidification discussed in a qualitative manner. A relatively new method of electric analogy. Experiments carried out by this method show the beneficial influence of a carbon insert at the bottom of a mold. 12 ref.

2-183. X-X and X-O Bond Energies of Phosphorus, Arsenic and Antimony and Their Importance in the Kinetics of the Oxidation of These Elements. F. S. Dainton. *Transactions of the Faraday Society*, v. 43, May 1947, p. 244-256.

35 references.

2-184. Dusting in the Copper Smelter. W. H. Dennis. *Mining Magazine*, v. 77, July 1947, p. 16-22.

Procedures and equipment used in copper smelters to recover copper from the dust which is produced in large quantities from roasting, matte production, and converting. A flow diagram for dust recovery; diagrams of a wedge roaster and of reverberatory furnaces. (To be continued.)

2-185. Oxygen and the Openhearth Furnace. *Canadian Metals & Metallurgical Industries*, v. 10, July 1947, p. 16-22.

Various ways of using oxygen.

2-186. Kinetics of Solidification of Killed Steel Ingots. J. W. Spretnak. *Transactions of American Society for Metals*, v. 39, 1947, p. 569-619; discussion, p. 619-626.

The solidification of killed steel ingots was studied by the electrical analogy method and by actual bleeding tests on 6x6-in. and 20x23-in. ingots. The transverse solidification curve consists of two parabolas, the first with a constant K value representing columnar crystallization and the second representing equiaxed crystallization with a K value depending on the degree of superheat. The effect on the cone of solidification of insulating the bottom of the mold. 23 ref.

2-187. Ingot Factors in the Production of Seamless Gun Tubes. J. W. Spretnak, K. L. Fetters, and E. L. Layland. *Transactions of American Society for Metals*, v. 39, 1947, p. 627-650; discussion, p. 650.

The most significant ingot factor was the high frequency of occurrence of these bore defects in tubes processed from the bottom thirds of ingots. The position of maximum occurrence corresponds closely to the apex of the cone of solidification in the ingot. Optimum tapping and pouring temperatures and effects of mold size, ingot position, pouring temperature, and ingot transit time on the occurrence of bore defects.

2-188. Ladle Deoxidation of Killed Steel With Silicon Carbide and Its Effect on Physical Properties and Hardenability. Edward A. Loria and A. Paul Thompson. *Transactions of American Society for Metals*, v. 39, 1947, p. 651-665; discussion, p. 665-669.

A standard ladle deoxidation practice involving the use of granular silicon carbide and its establishment on the basis of heat or ingot quality. Numerous tests on commercial heats of both openhearth and electric-furnace steel show that silicon carbide deoxidation produces improved microstructure. The comparative effects of various ladle deoxidation practices on hardenability are shown for S.A.E. 1030, S.A.E. 1050, and N.E. 8640. The metallography of silicon-carbide-treated steel with particular reference to inclusions.

2-189. Manufacture of Basic Bessemer Steel Low in Nitrogen. Yves Dardel. *Metal Progress*, v. 52, Aug. 1947, p. 252-256.

Particularly during the war, great efforts were made in Europe to reduce nitrogen and hydrogen content, so that the basic bessemer's product could be used for heat treatable alloy steels, free from flakes in large sections. Hydrogen was controlled by drying the lime flux and blowing with dried air. Various schemes proposed and used to control the nitrogen.

2-190. Electric Furnace Rimmed Steel. D. I. Brown. *Iron Age*, v. 160, Aug. 7, 1947, p. 67-69, 149.

Production of rimmed steel in the electric furnace, using oxygen for carbon reduction. Comparisons between openhearth and electric-furnace practice for comparable grades of steel.

2-191. Steelmaking Oxygen Presenting Problems to Delay Applications. *Iron Age*, v. 160, Aug. 7, 1947, p. 113-115.

Four of the major problems involved in the use of oxygen in the openhearth.

2-192. Oxygen-Accelerated Combustion in Openhearth Furnaces. *Steel*, v. 121, Aug. 11, 1947, p. 94, 97-98, 102.

How introduction of oxygen at point of entry in furnace greatly increases efficiency of fuel-oil ignition and provides new tool for controlling length of flame, its calorific output, and travel, within greater limits.

2-193. Macro-Segregation in Some Alloy Steel Ingots. J. W. Spretnak. *American Society for Metals Preprint No. 25*, 1947. (To be published in *Transactions* for 1948.)

Macro-segregation in six alloy steel ingots was examined, using published allowable errors in the analysis of steel as the criterion in establishing the occurrence of segregation. A considerable variation in the amount of segregation was found. About half the patterns agree with the previously published pattern of positive and negative segregation in killed steel ingots.

2-194. Electric Smelting Points Way to Lower Cost. M. Sem and F. C. Collin. *Engineering and Mining Journal*, v. 148, Aug. 1947, p. 86-90.

The development of electric matte-smelting furnaces for production of copper flotation concentrates in Finland, Norway, Sweden, and the U. S. Methods for recovery of SO_2 which make the process economically attractive.

2-195. Production of Carbon and Alloy Steels by the Side-Blown Converter Process. F. Cousans. *Foundry Trade Journal*, v. 82, July 24, 1947, p. 275-280.

Production of molten metal for subsequent conversion, the conversion process, photo-electric cell control, degree of control, and physical and mechanical properties for alloy steels.

2-196. Discussion on the Blast Furnace of Today. Part I. A Review of Current Furnace Engineering. W. R. Brown. *Journal of the Iron and Steel Institute*, v. 156, July 1947, p. 399-400.

Discussion of papers published in January 1947 issue.

2-197. Use of Sponge Iron in Steel Production. R. C. Buehl, M. B. Royer, and J. P. Riott. *Bureau of Mines Report of Investigation 4096*, July 1947, 74 p.

History and literature review. Test data show that for sponge iron to be a desirable melting stock for acid electric furnaces, it should be low in sulphur and phosphorus. Sponge-iron slabs with a high silica content (about 7%) can be used to replace scrap in a basic openhearth charge to the extent of about 12% of a cold metal furnace charge without any appreciable change in operating procedure or reduction in furnace capacity.

2-198. The Josephtown Electrothermic Zinc Smelter. *Mining and Metallurgy*, v. 28, Aug. 1947, p. 398-405.

Descriptive series includes the following separate articles: An introduction, by H. K. Najarian. Roaster plant, by V. W. Simkins. Acid plant, by V. W. Simkins. Leaching plant, by Karl F. Peterson. Sinter plant, by Karl F. Peterson. Furnace plant, by James M. Brabec. Zinc oxide production at the Josephtown smelter, by J. J. Rankin. Shop facilities, by J. R. Kester. Industrial engineering department, by George E. Deeley. Engineering department, by W. B. MacBride. Research and development, by Frank M. Kennedy. The laboratories at the Josephtown smelter, by J. J. Rankin.

2-199. The Herculaneum Smelter. *Mining and Metallurgy*, v. 28, Aug. 1947, p. 377-382.

Various phases of the production of chemical and corroding grades of lead at smelter of St. Joseph Lead Co., Herculaneum, Mo. W. T. Isbell describes the over-all picture; John Sherman, the roasting department; J. O. McLellan, the blast furnaces; Finis Huddleston, the lead refinery; and Clyde Smith, the zinc plant.

Section 2. For additional annotations indexed in other sections, see: 1-89; 3-207-210; 4-112; 15-28; 16-92; 17-67-70; 18-160; 25-103; 26-104.

3 PROPERTIES OF METALS AND ALLOYS

3-197. Hardness and Hardenability in Carbon and Alloy Steels. *Product Engineering*, v. 18, July 1947, p. 141-143.

Difference between hardness and hardenability. Method of running standard end-quench hardenability tests. Effects of carbon and other alloys on hardness and hardenability. Typical hardenability curves.

3-198. Modified Type 405 Stainless Iron; a Satisfactory Lining for Petroleum Refinery Vessels. Merrill A. Scheil. *Metal Progress*, v. 52, July 1947, p. 91-102.

Results of extensive tests on various types of chromium steels. Penetration during immersion in boiling 65% HNO_3; corrosion and pitting after 6250 hr. in petroleum refinery service; hardening temperatures as an indication of weldability; and long-time stability. Investigations of six cases of embrittlement in service indicate that five were outside the required limits of chemical analysis. Only one was an example of stress-corrosion.

3-199. New Deep Hardening Carburizing Steels. *Iron Age*, v. 160, July 24, 1947, p. 62-64.

Properties of new steels announced by Carnegie-Illinois.

3-200. Influence of Cobalt on Properties of High Speed Steel. N. T. Gudtsov and K. M. Gelfand. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 93-104. (In Russian.)

Influence of a cobalt addition on properties of plain carbon steels has been investigated but the data are not applicable to high speed steels of complex composition. Investigations to determine the mechanism of the favorable effect of cobalt on cutting properties. 5 ref.

3-201. Correlation of Conditions of Deformation During Application of Pressure to Metals. S. I. Gubkin. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 117-123. (In Russian.)

Attempts to show that the so-called law of F. Kick, concerning the proportional resistance (or similarity) of metals, is invalid.

3-202. The Influence of the Rate of Deformation on the Cold Brittleness of Steel. Part III. F. F. Vitman. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 77-86. (In Russian.)

Experimental results confirm a previously reported exponential relationship. Tests were made on four different carbon steels and one alloy steel, before and after different heat treat-

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American Welding Society Program

28th Annual Meeting. All Sessions at Hotel Sherman, Chicago, Oct. 19-24

Sunday, Oct. 19

PRESIDENT'S RECEPTION

5 to 7 P.M.—Louis XVI Room

Monday Morning, Oct. 20

GENERAL SESSION

Ballroom

Directional Welding to Minimize or Eliminate Distortion in Weldments and Control Residual Stresses, by Joseph Holt, Consulting Engineer.

Precision Pressure Regulation of Various Gases, by J. K. Hamilton, Air Reduction.

Welded Fabrication, by Ray Stitt, R. C. Mahon Co.

RAILROAD WELDING

Louis XVI Room

Flame Hardening Locomotive Brake and Spring Rigging Pins and Bushings, by B. W. Covell, Northern Pacific Railway Co.

End-Hardening of Rails and Open-hearth Frogs, by R. W. Torbert, The Oxweld Railroad Service Co.

New Developments in Railroad Maintenance-of-Way Work, by C. A. Daley, Air Reduction.

Problems in Resistance Welding Stainless Steel Railway Car Structures, by J. Van den Beemt, The Budd Co.

AIR CONDITIONING AND REFRIGERATORS

Crystal Room

Welding in Assembly Line Production of Refrigerator Cabinets, by P. Bowman, Seeger Refrigerator Co.

High-Speed Automatic Oxy-Acetylene Welding, by H. O. Jones, Air Reduction.

Monday Evening, Oct. 20

AWARDS OF PRIZES AND MEDALS

ADAMS LECTURE

Ballroom

Structural Strength of the Welded Joint, by G. S. Mikhalapov, Air Reduction Sales Co.

Tuesday Morning, Oct. 21

PRESSURE VESSELS

Louis XVI Room

Welding of Locomotive-Type High-Pressure Boilers, by George M. Trefts, Farrar and Trefts, Inc.

Carbon-Arc Welding of Copper Pressure Vessels, by John J. Vreeland, Chase Brass & Copper Co.

Integral Cast Bosses for Pressure Vessels, by H. L. Anthony and H. P. Schane, Scaife Co.

Development of Butt Welded Joints in Pressure Vessels, by Edwin J. Brown, Union Iron Works.

Tuesday Morning *(Cont.)*

MISCELLANEOUS

Crystal Room

Multi-Flame Pressure Welding Process, by N. H. Cuke, Canadian Liquid Air Co., Ltd.

Controlled Low-Temperature Stress-Relieving of Welded Tanks for Wet Seal Gas Holder, by R. Kraus, Stacey Bros. Gas Construction Co.

Composite Alloy Fabrication With the Hidden Arc, by H. E. Cable, Lincoln Electric Co.

Semi-Automatic Welding With Standard Manual Arc Welding Equipment, by F. W. Myers, Jr., Watertown Arsenal.

RESEARCH

Ballroom

Determination of Physical Chemical Factors in Stress-Corrosion Cracking of Mild Steel, by H. J. McDonald and M. G. Winterstein, Illinois Institute of Technology.

Some Unusual Features Encountered in the Investigation of Cracked Welds in 35/15 Magnesium Retorts, by H. J. Nichols, Dept. of Mines and Resources, Ottawa, Ont., Canada.

Distribution of Strength and Ductility in Welded Steel Plate as Revealed by the Static Notch Bar Tensile Test, by W. F. Brown, Jr., L. J. Ebert and G. Sachs, Case Institute of Technology.

Tuesday Afternoon, Oct. 21

PIPE AND MAINTENANCE WELDING

Louis XVI Room

Metallurgical Properties of High-Yield Strength Seamless Line Pipe, by A. B. Wilder and J. D. Tyson, National Tube Co.

The Maintenance Welder, by Cleo E. Hook, Noblett Sparks Industries, Inc.

Building, Repairing and Design of Farm Machinery, by Ernest J. Koop, Ernest J. Koop Welding-Blacksmith Shop.

RESEARCH

Ballroom

Low-Temperature Charpy Tests of Various Ferritic Weld Deposits, by W. B. Bunn, The M. W. Kellogg Co.

The Effect of Titanium and Vanadium on the Mechanical Properties and Weldability of Experimental Low-Alloy, High-Tensile Steel, by George G. Luther, Donald B. Roach, and Carl E. Hartbower, Naval Research Laboratory.

Effects of Section Size on the Static Notch Bar Tensile Properties of Mild Steel Plate, by W. F. Brown, Jr., J. D. Lubahn and L. J. Ebert, Case Institute of Technology.

HIGH ALLOYS

Crystal Room

Welding and Fabrication of High-Temperature Alloys, by C. G. Chisholm, Haynes Stellite Co.

Some Factors Controlling the Ductility of 25 Cr, 20 Ni Weld Deposits, by O. R. Carpenter and N. C. Jessen, Babcock & Wilcox Co.

Selection of Austenitic Electrodes for Welding Dissimilar Metals, by Anton L. Schaeffler, Arcos Corp.

Tuesday, Oct. 21, 7:45 P.M.

UNIVERSITY RESEARCH CONFERENCE

Wednesday Morning, Oct. 22

RESISTANCE WELDING

Louis XVI Room

Flash Welding of the Structural Aluminum Alloys, by R. Condit Becker and Robert M. Curran, Rensselaer Polytechnic Institute.

Some Metallurgy Aspects of Carbon Steel Spot Welding, by Julius Heuschkel, Westinghouse Research Laboratories.

Engineering Symposium of Future Control of Resistance Welding Machines, by C. E. Smith, Taylor-Winfield Corp.

A Study of Projection Welding, by W. F. Hess and Wylie J. Childs, Rensselaer Polytechnic Institute.

CUTTING

Ballroom

Powder Cutting as a Production Tool, by D. H. Fleming, Jr., The Linde Air Products Co.

The Theory of Oxy-Arc Cutting, by H. C. Campbell, Arcos Corp.

Flux Cutting Alloy Steels, by G. E. Bellew, Air Reduction.

Oxy-acetylene Production Cutting in Steel Mills, by A. H. Yoch and W. Begerow, Air Reduction.

SHIP STRUCTURES RESEARCH

Crystal Room

Causes of Cleavage Fracture in Ship Plate—Tests of Wide Notched Plates, by A. Boodberg, H. E. Davis, E. R. Parker, and G. E. Troxell, University of California.

Cleavage Fracture of Ship Plates as Influenced by Size Effect, by W. M. Wilson, R. A. Hechtman, and W. H. Bruckner, University of Illinois.

A Study of Internally Notched Tensile Specimens for Evaluating the Toughness of Structural Steel, by H. R. Thomas and D. F. Windenburg, David Taylor Model Basin, U.S.N.

Investigation of Steels Removed From Fractured Ships, by G. A. Ellinger and Morgan L. Williams, U. S. Bureau of Standards.

(Continued on page 13)

ments. A specially developed, rotating impact-test apparatus was used.

3-203. Generalization of Elastic-Plastic Deformation. Ia. A. Macheret. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 87-102. (In Russian.)

A mathematical development. Deformation of the general type is considered to be a combination of three types: instantaneous, "hereditary," and residual. An equation is derived which combines the general type of deformation with stress, under certain conditions.

3-204. Surface Tension of Metals. A. G. Samoilavich. *Journal of Physical Chemistry (U.S.S.R.)*, v. 21, no. 2, 1947, p. 161-162. (In Russian.)

A mathematical analysis shows that the expression proposed for surface tension does not depend upon the model which was used for its development.

3-205. Mumetal—A High-Permeability Alloy. N. G. Neuweiler. *Microtecnic (English Section)*, v. 1, Feb. 1947, p. 15-17.

Magnetic and electrical properties, uses, and testing methods for new iron-nickel alloy.

3-206. Sur l'Ansotropie Optique des Siliciures de Fer, de Manganese et de Nickel. (Optical Anisotropy of Silicon Alloys of Iron, Manganese, and Nickel.) Theophile Cambon. *Comptes Rendus*, v. 224, April 14, 1947, p. 1112-1114.

Characteristics of diverse optically anisotropic phases of these alloys.

3-207. La Fabrication des Lingotières d'Aciérie. (Production of Steel Ingot Molds.) Alphonse Charmeau. *Fonderie*, April 1947, p. 601-611.

Results of an investigation of the influence of various factors on the properties of ingot molds, and results of the influence of titanium-vanadium and chromium-titanium on mold quality.

3-208. Frottement Interieur des Metaux et des Alliages Ferromagnetiques. (Internal Friction of Ferromagnetic Metals and Alloys.) Christian Boulanger. *Comptes Rendus*, v. 224, May 5, 1947, p. 1286-1288.

Magnetization of metals and alloys decreases their internal friction. A field of 100 oersteds, sufficient to saturate ferronickel containing 46% Ni, decreased the internal friction 35 times, and in pure nickel, 100 times. This phenomenon may have caused some of the disagreements in the experimental results reported by different authors.

3-209. Comparing Plastics. C. E. Staff, J. M. Hill, and H. M. Quackenbos, Jr. *Machine Design*, v. 19, July 1947, p. 112-116.

Mechanical properties are compared with those of the common structural metals. 18 ref.

3-210. Carbon and Graphite. *Machine Design*, v. 19, July 1947, p. 157-160.

Forms available; properties; characteristics; applications; fabrication; methods of fastening; design tips.

3-211. Drawing Die Problems and Formulas. James Walker. *Tool Engineer*, v. 18, July 1947, p. 29-34.

Uses, properties, and heat treating of toolsteels.

3-212. The Physics of Sheet Steel. (Continued.) G. C. Richer. *Sheet Metal Industries*, v. 24, July 1947, p. 1361-1365.

Structures resulting from rolling. Magnetic properties. 13 ref. (To be continued.)

3-213. Influence de la Grosseur de la Cristallisation, des Constituants hors de Solution Solide et des Impuretés sur la Forgeabilité des Alliages Légers. (Influence of the Size of Crystallization, the Constituents Not in Solid Solution, and Impurities on the Forgeability of Light Alloys.) Paul Bastien. *Métaux et Corrosion*, v. 21, Aug-Sept. 1946, p. 105-119.

Forgeability of new alloys was determined by the combined use of static and dynamic bend tests at various temperatures. The study of plastic deformation of various binary alloys led to the formulation of general laws for forgeability.

3-214. The Fatigue Characteristics of Copper-Nickel-Zinc and Phosphor Bronze Strip in Bending Under Conditions of Unsymmetrical Loading. G. R. Gohn and W. C. Ellis. *American Society for Testing Materials Preprint 25*, 1947, 9 p.

Fatigue tests in bending on two nonferrous materials in strip form under conditions of unsymmetrical loading. The machine and test methods developed for making such tests. S-N curves and other curves showing the effect of mean stress on the range of stress in unsymmetrical repeated bending. 10 ref.

3-215. An Experimental Study of the Propagation of Plastic Deformation Under Conditions of Longitudinal Impact. P. E. Duwez and D. S. Clark. *American Society for Testing Materials Preprint 31*, 1947, 21 p.

The theory of plastic-strain propagation with reference to longitudinal impact. Special impact-testing equipment furnishes data for verification of the theory. Tests in tension on long wires and on specimens with a gage length of 8 in. together with the results of some tests made in compression. The effect of release of loading and reflection of plastic-strain waves on plastic-strain distribution. The concept of critical velocity. The anomalous behavior of material for which there is a yield point. Results indicate satisfactory agreement between theory and experiment. 10 ref.

3-216. Plastic Flow of a Magnesium Alloy Under Biaxial Stresses. D. M. Cunningham, E. G. Thomsen, and J. E. Dorn. *American Society for Testing Materials Preprint 33*, 1947, 8 p.

Results of an experimental evaluation of the plastic flow of AZ61 magnesium-alloy extrusions under varying ratios of biaxial stressing. 21 ref.

3-217. Welding or Sticking of Electrical Contacts. Erie I. Shobert, II. *American Society for Testing Materials Preprint 96*, 1947, 15 p.

A method for evaluating the welding and sticking characteristics of contacts was developed. Consistent results were obtained in six different laboratories. Theory and a formula for the relationship between current on the testing machine and physical properties of the contact materials.

3-218. Corrosion Resistant Metals for Valves and Seats on Heavy-Duty Engines. A. T. Colwell. *Society of Automotive Engineers Preprint*, 1947, 21 p.

The properties of various high-temperature, corrosion resistant alloys. How valve life can be improved by correct design principles, including use of valve-seat inserts.

3-219. An Investigation of the High-Temperature Properties of Chromium-Base Alloys at 1350° F. J. W. Freeman, E. E. Reynolds, and A. E. White. *National Advisory Committee for Aeronautics Technical Note No. 1314*, May 1947, 21 p.

Chromium-base alloys had rupture strengths as high as 73,000 and 54,500 psi., respectively, for fracture in 100 and 1000 hr. at 1350° F. The highest similar values published for other alloys are in the order of 50,000 and 40,000 psi. The most promising chromium-base alloy at 1350° F. for buckets for gas turbines appears to be 60Cr-25Fe-15Mo with less than 0.05% carbon and from 0.5 to 0.7% silicon.

3-220. Les Principales Maladies de la Malleable a Coeur Noir et leur Diagnostic Micrographique. (Principal Defects of Black Heart Cast Iron and Their Micrographic Examination. Concluded.) Henri Laplanche. *Fonderie*, March 1947, p. 564-581.

Many charts, photomicrographs, and a table of defects, structures, and possible causes.

3-221. Temperature Dependence of Coercive Force in Monocrystals of Transformer Steel. Ia. S. Shur. *Journal of Experimental & Theoretical Physics (U.S.S.R.)*, v. 17, no. 3, 1947, p. 238-239. (In Russian.)

The temperature dependence of coercive force was determined on a single crystal of the above material at 420 and 195° C.

3-222. Abnormality in the Thermal Expansion of Iron-Platinum Alloys. Hakaru Masumoto and Takero Kobayashi. *Headquarters Air Materiel Command, Wright Field, Translation F-TS-1878-RE*, May 1947, 7 p.

Thermal expansion of the entire series was measured. The alloy containing 52.5 to 53.5% Pt had a negative coefficient of expansion over a wide temperature range. The maximum value of this coefficient reached -3.5×10^{-5} at −40° for 52.5% Pt. Results show that theory proposed by one of the authors is qualitatively correct. (From report dated Nov. 1945.)

3-223. On the Law of Deformation of Amorphous and Polycrystalline Bodies. G. Gurlevich. *Comptes Rendus de l'Academie des Sciences de l'U.R.S.S.*, v. 55, no. 6, 1947, p. 493-496. (In English.)

A relationship is derived for the dependence of yield stress on rate of deformation and for dependence of rate of deformation on the load. It was found to be valid experimentally for a wide range of rigidities for materials of diverse structures, such as different plastic film materials, aluminum, lead, and copper wire. 12 ref.

3-224. Investigations Concerning the Suitability of Heat Resisting Materials for Exhaust-Gas Turbine Blades. H. Cornelius, W. Bungardt and F. Bollenrath. *Headquarters Air Materiel Command, Wright Field, Translation F-TS-1862-RE*, June 1947, 17 p.

Twenty-two austenitic ferrous and nonferrous metals were examined at temperatures from 600 to 1000° C. to determine their suitability for exhaust-gas turbine blades. Test results for tensile strength, thermal expansion, specific weight, elasticity coefficient, forge-scaling resistivity, and change of physical properties under high temperatures. (Translated from report of *Deutsche Versuchsanstalt für Luftfahrt, Berlin-Adlershof.*)

3-225. Hydrogen and Transformation Characteristics in Steel. J. H. Andrew, H. Lee, H. K. Lloyd, and N. Stephenson. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 208-260.

A comprehensive study of hydrogen evolution from 22 different steels. The effects of alloying elements and crack formation in isothermally treated specimens. Hydrogen embrittlement was found to vary with thermal treatment. It is closely associated with hairline cracks, and hydrogen diffusivity and solubility are the controlling factors for both.

3-226. Beryllium and Beryllium Bronze (Beryllium Copper). (Continued.) Robert Gadeau. *Microtecnic (English Section)*, v. 1, June 1947, p. 69-71.

Application to windows for X-ray tubes; analysis of beryllium alloys; various alloys other than beryllium copper. (To be continued.) (Translated from the French. For illustrations, see *French Section*, p. 163-167.)

3-227. Low-Alloy, High-Strength Steels. *Materials & Methods*, v. 26, July 1947, p. 101.

Eight or ten steels presented. Introductory material; general characteristics; corrosion resistance; notch toughness; joining and working; design considerations; applications; and economics. 13 ref.

3-228. Lead Improves Aluminum-Magnesium Alloys. *Materials & Methods*, v. 26, July 1947, p. 126-127.

Properties resulting from addition

(Turn to page 14)

AMERICAN WELDING SOCIETY PROGRAM

(Continued from page 11)

Wednesday Afternoon, Oct. 22

RESISTANCE WELDING

Louis XVI Room

The Heat Treatment of Spot Welds of Steel Plate, by W. d'Orville Doty, Wylie J. Childs and W. F. Hess, Rensselaer Polytechnic Institute.

The Development and Application of Quality Control Techniques to Resistance Welding Production, by O. C. Frederick, General Electric Co.

Shunt Circuit Impedance in Spot Welding, by Robert Blair, Taylor-Winfield Corp.

NONFERROUS

Crystal Room

Arc Welding Copper and Copper-Base Alloys, by F. E. Garriott, Ampco Metal, Inc.

Static Strength Tests of Fillet Welds on Aluminum Alloy 61S-T Plate, by R. L. Moore, Aluminum Co. of America.

Welding of Bronze Gears With a Steel Web and Hub, by Otto D. Klug, Alloys Welding Specialists Co.

SHIP STRUCTURES RESEARCH

Ballroom

The Work of the Ship Structures Committee, by Rear Admiral Ellis Reed-Hill, Chairman Committee, U. S. Coast Guard.

Tests of Various Designs of Welded Hatch Corners for Ships, by E. Paul DeGarmo, University of California.

Correlation Investigations of Small Specimens With Wide Plate Tests, by Maxwell Gensamer, Carnegie-Illinois Steel Corp., E. P. Klier and S. C. Wacner, Pennsylvania State College.

A Method of Evaluating Transition From Shear to Cleavage Failure in Ship Plate and Its Correlation With Large Scale Plate Tests, by Noah A. Kahn and Emil A. Imbembo, New York Naval Shipyard.

Thursday Morning, Oct. 23

ALLOY STEELS

Louis XVI Room

Factors Affecting Weldability of Carbon and Alloy Steels, by C. E. Jackson, K. H. Koopman and C. M. Offenhauer, Union Carbide & Carbon Research Labs.

Submerged Melt Welding of Steels of High Hardenability, by E. A. Clapp and E. L. Frost, Union Carbide & Carbon Research Labs.

Macro-Etching and Photomacrography of Ferritic and Austenitic Welded Joints in Low-Alloy Steel, by O. O. Miller and E. G. Houston, United States Steel Corp.

MISCELLANEOUS

Crystal Room

Design of Arc Welded Steel and Its Relation to Cost, Motion Picture, by R. H. Davies, Lincoln Electric Co.

High-Speed Technicolor Motion Picture of Welding Arc, by G. E. Claussen, Reid-Avery Co.

High-Speed Heliarc Welding, by H. E. Rockefeller, Linde Air Products Co.

Stud Welding, by R. C. Singleton, Nelson Sales Corp.

STRUCTURAL

Ballroom

Design and Construction of Welded R search Laboratory Building, by L Motte Grover, Air Reduction.

Shape-Welding by the Submerged Me Process, by J. A. Kratz, The Lin Air Products Co.

Studies on Effect of Red Lead Pain on the Quality of Metal-Arc Welds Structural Steel, by R. W. Bennet R. D. Williams and C. B. Voldric Battelle Memorial Institute.

Thursday Evening, Oct. 23

ANNUAL BANQUET

7:00 P.M.—Ballroom

Friday Morning, Oct. 24

INERT GAS WELDING

Louis XVI Room

Mechanized Inert-Gas-Shielded Arc Welding, by H. T. Herbst, The Linde Air Products Co.

New Applications of Inert-Arc Welding, by R. W. Tuthill, General Electric Co.

Friday Afternoon, Oct. 24

BUSINESS SESSION

2:00 P.M.—Crystal Room

BOARD OF DIRECTORS MEETING

3:00 P.M.—Room 118

American Industrial Radium and X-Ray Society

Seventh Annual Meeting and Convention. All Sessions at Hotel Morrison, Chicago, October 22, 23 and 24

Wednesday, Oct. 22

9:30 A.M. to 12 Noon

Profitable Mass X-Ray Inspection, by Justin G. Schneeman

Skin Thickness in Bronze Castings as Shown by X-Ray of Thin Sections, by Carleton G. Lutts

Polaroid Vectograph Technique Applied to Stereo-Microradiography, by Don M. McCutcheon and Merle F. Valade

2 P.M. to 4:30 P.M.

Development of a Universal Exposure Slide Rule for Radium Radiography, by Jay Bland and N. A. Kahn

The Use of Isotopes in Industrial Radiography, by Gerold H. Tenney

A Metallurgical Problem Solved by X-Ray Diffraction, by Herbert Mermagen

Thursday, Oct. 23

9:30 A.M. to 12 Noon

Analysis of Industrial Problems—Coordinated Spectroscopy and X-Ray Diffraction, by W. J. Poehlman and W. A. Kluck

Automatic Processing of X-Ray Film, by F. Glenn Hamilton and Robert Sardeson

Influence of Field Size on Contrast and Exposure in Industrial Radiography, by E. Dale Trout and A. L. Pace

2 P.M. to 4:30 P.M.

LESTER LECTURE AND ANNUAL MEETING

Non-Destructive Testing in the Design, Manufacture, and Evaluation of Naval Ordnance, by Leslie W. Ball

Friday, Oct. 24

9:30 A.M. to 12 Noon

Application of Radiography in Die Casting, by R. W. Dively

Electronic Applications to Nondestructive Testing, by Arthur E. Johnson

Deflected Beam Technique in Million-Volt Radiography, by Harold Wagner and Don M. McCutcheon

2 P.M. to 4:30 P.M.

The Application of the 20-Million-Volt Betatron to Industrial Radiography, by Jack T. Wilson

Van De Graaff 2-Million-Volt X-Ray Precision Radiographic Technique, by A. E. Burrill

The Use of Filters in Million-Volt Radiography, by G. M. Corney

A Dinner Meeting of the Gun Development Group for Members Only Will Be Held at 7:00 P. M. Wednesday, Oct. 22, at the Union League Club in Chicago

f up to 2.5% Pb to an aluminum alloy ontaining 8% Mg. (Translated and ondensed from *Aluminum-Archiv*, v. 4, 1939.)

29. **Gas Turbine Forgings.** (Concluded.) D. A. Oliver and G. T. Harris. *n and Steel*, v. 20, July 1947, p. 339-1.

Development of British G.18B and R.20 high creep strength austenitic steels and their creep strength properties. 13 ref.

230. **Toolsteels.** *Machinery Lloyd Overseas Edition)*, v. 19, July 5, 1947, 76-86.

Properties of the various types; working and heat treating high speed steels, carbon toolsteels, modified carbon, and shock-resisting toolsteels.

231. **Molybdenum Alpha Irons; a New ange of High Duty Alloys.** *Alloy Metals eview*, v. 5, June 1947, p. 2-6.

Recent investigations have shown that low-carbon, higher molybdenum steels retard hardenability, and have led to the development of a series of compositions possessing special properties. Potential applications of this new type of material.

-232. **Bearing Properties of 24S-T heet and Shear Strength of 24S-T ivets at Elevated Temperatures.** A. E. lanigan, L. F. Tedsen, and J. E. Dorn. *ransactions of American Society for Metals*, v. 38, 1947, p. 789-804; discussion, . 804-806.

Shear strength and bearing properties were determined after exposure to temperatures up to 375° F., for periods ranging from ¼ hr. to 1000 hr.

1-233. **Cast Heat Resistant Alloys of the 16% Chromium-35% Nickel Type.** Howard S. Avery and Norman A. Matthews. *Transactions of American Society for Metals*, v. 38, 1947, p. 957-1015; discussion, p. 1015-1022.

The "HT"-type cast alloy with data covering mechanical properties at room temperature, as cast and after aging at 1400° F.; elevated temperature strength and ductility from 1400 to 2200° F.; stress-rupture properties; creep strength from 1400 to 2150° F.; suggested working stresses; magnetic permeability; thermal expansion; elastic modulus at 1400 to 1800° F.; resistance to carburization and hot gas corrosion; and the effect of temperature fluctuations on creep rates. The relationship between yield strength and hindered contraction stresses in connection with thermal fatigue. Pertinent comparisons with the "HH" (26% Cr, 12% Ni) alloys are included. 21 ref.

3-234. **Fatigue Testing of "Zh.I" Stainless Steel at High Temperatures.** M. J. Sichikov, Z. D. Vishnevetskii, and D. L. Ginberg. *Boiler and Turbine Construction (U.S.S.R.)*, Feb. 1947, p. 22-24. (In Russian.)

Results of an investigation of the above steel (13 to 14% Cr; 0.58% Ni; 0.43% Si; 0.30% Mn; 0.12% C; 0.026% P; and 0.018% S) at different temperatures from 20 to 600° C.

3-235. **Correlation of Shrinkage Cracks in Castings With the Composition of the Alloy.** A. A. Bochvar and S. A. Sviderskaia. *Bulletin of the Academy of Sciences of the U.S.S.R. (Section of Technical Sciences)*, no. 3, 1947, p. 349-355. (In Russian.)

On a series of aluminum-copper and aluminum-silicon alloys it was demonstrated that maximum hot shortness of aluminum-copper alloys corresponds to a 2% copper content and in the aluminum-silicon alloys, to a silicon content under 1.6%. In the maximum hot shortness range, shrinkage stresses under 3 psi. can cause hot tears.

3-236. **Conductivity of Metallic Surfaces at Microwave Frequencies.** E. Maxwell. *Journal of Applied Physics*, v. 18, July 1947, p. 629-638.

Methods consist of either measuring the transmission loss in a long wave guide, or in measuring the Q's of resonant cavities. Both methods were applied to measurements at 1.25 cm. Results for a number of metals.

3-237. **Mechanical Properties of Cast Low-Alloy Steels.** Malcolm F. Hawkes. *Transactions of American Society for Metals*, v. 39, 1947, p. 1-40; discussion, p. 41-44.

Hardenability, tensile and impact property data, grain size, inclusion ratings, and other characteristics were determined on 32 cast alloy steels of the N.E. type. Nine grades of steels made by the acid openhearth, acid electric, basic openhearth, and basic electric processes were studied. It is concluded that cast N.E. alloy steels with properties comparing favorably with the older cast and wrought alloy steels can be produced readily.

3-238. **The Effect of Composition on the Fatigue Strength of Decarburized Steel.** L. R. Jackson and T. E. Rochapsky. *Transactions of American Society for Metals*, v. 39, 1947, p. 45-57; discussion, p. 57-60.

Fatigue strength of the decarburized layers is determined by the strength of the ferrite in the decarburized zone and can be controlled by the composition of the ferrite. Decarburization has relatively less effect on fatigue strength at high stresses than at low stresses. Tests were run on S.A.E. 2340, 4140, and 5140, in which the effect of surface decarburization on the fatigue strength was explored at two hardness levels both in the presence and in the absence of notches. Results indicate that the core hardness does have an effect on the fatigue strength of decarburized test pieces.

3-239. **Electrolytic Conductivity as a Method for Studying Electronic Transitions in Elements—Application to Iron, Nickel and Cobalt.** W. R. Ham and C. H. Samans. *Transactions of American Society for Metals*, v. 39, 1947, p. 73-99, discussion, p. 99-108.

New method is based upon electrolytic conductivity in a glassy carrier. Results for six different iron glasses as well as for two nickel glasses and one cobalt glass. As in previous hydrogen diffusion studies, the temperatures at which breaks occur in log resistance vs. T-curves for iron are represented within the limits of experimental accuracy, by Ritz-type formulas. Data are given for the various transition temperatures. 10 ref.

3-240. **The Ductility of Metals Under General Conditions of Stress and Strain.** John E. Dorn and E. G. Thomsen. *Transactions of American Society for Metals*, v. 39, 1947, p. 741-772.

Method for calculating the limiting strains at fracture under combined stresses assumes that the metal is homogeneous, isotropic, and that the plastic deformation is isovolumetric. A simple relationship is derived for a generalized workhardening curve. The theory deviates up to about 10% from the experimental facts. Numerous examples of the correlation between predicted and experimentally obtained strains at fracture. 11 ref.

3-241. **New Wrought Zinc Alloys Containing Small Amounts of Beryllium.** R. H. Harrington. *Transactions of American Society for Metals*, v. 39, 1947, p. 773-783; discussion, p. 783-787.

Because of inherently high rates of creep, commercial zinc alloys are usually tested at the rate of extension of ¼-in. per min. A commercial grade of copper-hardened zinc gave a proportional limit of 2200 psi, a tensile strength of 24,700 psi., and an elongation of 52%. By the same method zinc alloys containing copper and beryllium give proportional limits of 15,000 to 16,000 psi, 0.5% offset yield strengths 30,000 to 35,000 psi., tensile strengths of 40,000 to 46,000 psi., and elongations of 20 to 30%. They age-harden at 175° C. and do not recrystallize below 200° C. Addition of beryllium also improves corrosion resistance.

3-242. **Boron in Steel.** Murray C. Udy. *Metal Progress*, v. 52, Aug. 1947, p. 257-264.

Results of some of the many investigations conducted during the war by various governmental and private agencies.

3-243. **Selecting Spring Materials.** F. P. Zimmerli. *Steel*, v. 121, Aug. 11, 1947, p. 78-79, 108, 111, 114, 116, 120, 122, 125, 128.

Some diversified flat and wire materials used by the mechanical or cold forming and by the heavy or hot forming spring industries.

3-244. **The Effect of Carbon Content on the Hardenability of Boron Steels.** G. D. Rahrer and C. D. Armstrong. *American Society for Metals Preprint No. 2*, 1947, 14 p. (To be published in *Transactions* for 1948.)

With boron additions of 0.0006% to 0.0045%, only carbon content and intensity of deoxidation affect the hardenability factor for boron to a demonstrable degree. Steel must be well deoxidized in order to attain the potential increase in hardenability from a boron addition.

3-245. **Beryllium in Magnesium Casting Alloys.** Jay R. Burns. *American Society for Metals Preprint No. 10*, 1947. (To be published in *Transactions* for 1948.)

Marked burning inhibition and grain coarsening were noted, and beryllium additions were also effective in removing iron and manganese from magnesium. Various grain refining techniques were attempted with partial success. A relationship is established between grain size and mechanical properties of AZ92 alloy, solution heat treated.

3-246. **Cast Heat Resistant Alloys of the 26% Cr-20% Ni Type. Part I.** Howard S. Avery and C. R. Wilks. *American Society for Metals Preprint No. 16*, 1947. (To be published in *Transactions* for 1948.)

Data cover: mechanical properties at room temperature; stress-rupture and creep properties from 1400 to 2000° F.; thermal expansion; resistance to carburization and hot gas corrosion; and several miscellaneous properties. The HK grade is suggested for general hot-gas corrosion resistance. It is also well suited for carburizing service when fortified with about 2% silicon.

3-247. **The Cobalt-Chromium J Alloy at 1350 to 1800° F.** Nicholas J. Grant. *American Society for Metals Preprint No. 17*, 1947. (To be published in *Transactions* for 1948.)

Properties and effects of content variations for a new cast alloy designated as "J" alloy which is based on Vitallium as a starting point.

3-248. **Mechanical Properties of Metals at Low Temperatures; A Survey.** L. Seigle and R. M. Brick. *American Society for Metals Preprint No. 19*, 1947. (To be published in *Transactions* for 1948.)

The literature is classified on the basis of the polycrystalline and the single crystal forms. It is critically evaluated.

3-249. **Influence of Metallurgical Factors on the Mechanical Properties of Steel.** S. A. Herres and C. H. Lorig. *American Society for Metals Preprint No. 20*, 1947. (To be published in *Transactions* for 1948.)

Results obtained in several series of experiments carried out during the war at Watertown Arsenal laboratory and Battelle Memorial Institute. The principal factors considered were amount, type, and distribution of nonmetallic inclusions; amount, type, and distribution of carbides; grain size; and precipitation-hardening reactions.

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Fall Meeting of the Metals Divisions, A.I.M.E.

All Meetings at Stevens Hotel, Chicago, Oct. 20-22

Monday, Oct. 20

8:30 A.M. to 5:00 P.M.—REGISTRATION

10:00 A.M.—COPPER AND COPPER ALLOYS

(Institute of Metals Division)

Some Observations of Lineage in Copper Crystals, by W. R. Hibbard, Jr.

The Isothermal Transformation of a Eutectoid Aluminum Bronze, by D. J. Mack

Preferred Orientations in Drawn and Annealed 70-30 Alpha Brass Tubes, by W. R. Hibbard, Jr.

12:30 P.M.—EXECUTIVE COMMITTEE LUNCHEON AND MEETING

(Institute of Metals Division)

2:00 P.M.—RECRYSTALLIZATION AND GRAIN GROWTH

(Institute of Metals Division)

The Comparative Properties of Several Types of Commercial Coppers as Cold Worked and as Recrystallized, by L. R. Jackson, A. M. Hall, and A. D. Schwope

The Effect of Mechanical Deformation on Grain Growth in Alpha Brass, by J. E. Burke and Y. G. Shiau

Grain Growth in High-Purity Aluminum and in an Aluminum-Magnesium Alloy, by P. A. Beck, J. C. Kremer, L. J. Demer, and M. L. Holzworth

2:00 P.M.—METALLOGRAPHY

(Iron and Steel Division)

Austenite Transformation Above and Within the Martensite Range, by R. T. Howard, Jr., and M. Cohen

Behavior of Metal Cavity Liners in Shaped Explosive Charges, by G. B. Clark and W. H. Bruckner

Testing Gun Steel and Other Alloys and Metals for Resistance to Surface Cracking, by E. Ingerson

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Tuesday, Oct. 21

9:30 A.M.—LIGHT METALS

(Institute of Metals Division)

Vacuum Process for Preparation of Lithium Metal From Spodumene, by R. G. Stauffer

Purification of Aluminum and Its Alloys, by Y. Dardel

Quenching of 75S Aluminum Alloy, by W. L. Fink and L. A. Willey

Factors Involved in Heat Treating a Magnesium Alloy, by A. E. Flanigan, I. I. Cornet, R. Hultgren, J. T. Lapsley and J. E. Dorn

10:00 A.M.—STEELMAKING

(Iron and Steel Division)

Structure, Segregation and Solidification of Semikilled Steel Ingots, by M. Tenenbaum

12:30 P.M.—EXECUTIVE COMMITTEE LUNCHEON AND MEETING

(Iron and Steel Division)

2:00 P.M.—SURFACE FILMS AND CORROSION

(Joint Meeting of Both Divisions)

Passivity in Chrominum-Iron Alloy Adsorbed Iron Films on Chromium, by H. H. Uhlig

Thin Oxide Films on Molybdenum, E. A. Gulbransen and W. S. Wyso

Thin Oxide Films on Tungsten, by A. Gulbransen and W. S. Wysong

Effect of Tension and Compression on the Corrosion of an Aluminum Alloy, by W. D. Robertson

6:00 P.M.—COCKTAIL PARTY

7:00 P.M.—ANNUAL FALL DINNER OF METALS DIVISIONS

Wednesday, Oct. 22

2:00 P.M.—GENERAL SESSION

(Joint Meeting of Both Divisions)

Plating Molybdenum, Tungsten and Chromium by Thermal Decomposition of Their Carbonyls, by J. J. Lander and L. H. Germer

An Electrolytic Method for Pointing Tungsten Wires, by W. G. Pfann

Tantalum Powder by Magnesium Reduction, by J. Prieto Isaza, A. J. Shaler and John Wulff

Fundamental Relations in the Fracturing of Metals

A Seminar Sponsored by the American Society for Metals, and Coordinated by Case Institute of Technology, Palmer House, Chicago, Oct. 18 and 19

Sat., Oct. 18—10:00 A.M.

Chairmen—George Sachs, Case Institute of Technology, and L. H. Donnell, Illinois Institute of Technology.

General Introduction, by Maxwell Gensamer, Carnegie-Illinois Steel Corp.

The Micro-Mechanisms of the Initiation of Fracture, by Clarence Zener, University of Chicago.

Effects of Stress State on Fracture, by J. E. Dorn, University of California.

Sat., Oct. 18—2:00 P.M.

Chairmen—C. S. Smith, University of Chicago, and D. F. Windenburg, David Taylor Model Basin.

Effects of Strain on Fracture, by George Sachs, Case Institute of Technology.

Effects of Structure on Fracture, by J. H. Hollomon, General Electric Co.

Metallurgical Aspects of Brittle Fracture Phenomena in Structures, by I. G. Slater, British Admiralty Delegation.

Effects of Section Size on Fracture, by E. R. Parker, University of Calif.

Sat., Oct. 18—8:00 P.M.

Chairmen—Finn Jonassen, National Research Council, and J. H. Hollomon, General Electric Co.

Fracture Dynamics, by George Irwin, Naval Research Laboratory.

Reduction of Data on Ductility of Steel, by W. P. Roop, Swarthmore College.

Fracturing Characteristics of Low-Carbon Steel, by P. Shearin, North Carolina University.

Sun., Oct. 19—9:00 A.M.

Chairmen—L. E. Grinter, Illinois Institute of Technology, and Maxwell Gensamer, Pennsylvania State College.

Fracture and Hydrostatic Pressure, by P. W. Bridgman, Harvard University.

Notch Bar Tensile Testing, by J. D. Lubahn, General Electric Co.

Report on Conference on Mechanical Properties of Solids at the University of Bristol, by N.F.R. Nabarro, Naval Research Laboratory.

Sun., Oct. 19—2:00 P.M.

Chairmen—W. P. Roop, Swarthmore College, and J. E. Dorn, U. of Calif.

New Testing Machines for Combined Stress Experiments, by J. Marin, Pennsylvania State College.

Time Effect in the Fracture of Materials, by E. Saibel, Carnegie Institute of Technology.

Dislocation Theory of the Fatigue of Metals, by E. S. Machlin, National Advisory Committee for Aeronautics.

6:00 P.M.—INFORMAL DINNER

Sun., Oct. 19—8:00 P.M.

Chairmen—G. Irwin, Naval Research Lab., and J. Marin, Penn State.

Projected Experimental Study of the General Laws for Deviation From Elastic Behavior Under Combined Stresses, by L. H. Donnell, Illinois Institute of Technology.

Correlations Between the Fracture of Metals in Shear With Their True Stress-Strain Properties, by T. A. Read, Frankford Arsenal.

3-250. The Fatigue Strength of Binary Ferrites. E. Epremian and E. F. Nippes. *American Society for Metals Preprint No. 21*, 1947. (To be published in *Transactions* for 1948.)

Tests in the Quinlan pneumatic fatigue machine indicate that the relative order of effectiveness of alloying elements in binary solid solution on the endurance limit of ferrite is Ti, Mo, Si, Mn, Ni, Co, and Cr. The effectiveness varies inversely with the extent of their solid solubility in iron. The changes in the power requirements to maintain a bar at constant stress during a fatigue test were found to be caused by changes in the damping capacity due to cold work. The occurrence of fatigue failure is defined by a decrease in the natural frequency of the sample.

3-251. The Effect of Silicon on the Properties of Cast Carbon and Carbon-Molybdenum Steels. N. A. Ziegler, W. L. Meinhart, and J. R. Goldsmith. *American Society for Metals Preprint No. 29*, 1947. (To be published in *Transactions* for 1948.)

Another step in the authors' work to isolate one variable at a time and to determine its effect on thermal characteristics, physical properties, weldability, and hardenability of cast carbon and low-alloy steels.

3-252. Les Ecarts de la Loi de Hooke. Tentative en vue de leur Determination Experimentale. (Deviations from Hooke's Law; Attempts to Determine Them Experimentally.) Adrien Jaquerod. *Revue de Metallurgie*, v. 43, Sept-Oct. 1946, p. 257-264; discussion, p. 264.

Certain nonferromagnetic alloys in the cold worked condition have a Coulomb modulus which varies parabolically with the stress. Reheating increases the modulus. Hooke's law does not seem to be obeyed as a limiting law by invar alloys. Pure nickel presents many anomalies.

3-253. Influence de la Composition Chimique et de la Structure de Certains Alliages Metalliques sur leur Capacite d'Amortissement. (Influence of Chemical Composition and Structure of Certain Metallic Alloys on Their Damping Capacity.) Leon Guillet, Jr. *Revue de Metallurgie*, v. 43, Sept-Oct. 1946, p. 265-267; discussion, p. 267.

Results of experiments discussed and shown graphically.

3-254. Hardenability in Relation to Steel and Cast Iron—Its Meaning and Measurement. Albert Portevin. *Engineers' Digest (American Edition)*, v. 4, July 1947, p. 306-308.

Hardenability of steels and of test pieces and hardenability tests. (To be continued.) (Condensed from *Iron and Coal Trades Review*, v. 154, April 18, 1947, p. 683-688; April 25, 1947, p. 719-724; May 2, 1947, p. 769-773.)

3-255. Precipitation-Hardened Alloys for Gas Turbine Service. Part I. Metallurgical Considerations. Part II. Design and Application Data. Howard Scott and R. B. Gordon. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 583-591; p. 593-599.

Selection of base alloy and hardening agent, choice of heat treatment for optimum properties, and the use of short-time tensile and creep rupture tests in evaluating the effects of composition and heat treatment variables. The creep rupture properties of K42B, Discaloy, Refractaloy 26, and Refractaloy 70 in the form of design curves for each alloy at one or more temperatures.

3-256. Nickel-Chromium Alloys for Gas Turbine Service. C. A. Crawford. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 609-612.

Two nickel-base alloys for gas turbine applications at temperatures up to 1500° F. and possibly higher. Inconel X is a wrought material, readily forged and welded, with high rupture strength at all temperatures. The second alloy is a cast material primarily suited for extended service applications requiring high creep resistance in the neighborhood of 1500° F.

3-257. Haynes Alloys for High-Temperature Service. W. O. Sweeny. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 569-580; discussion, p. 580-581.

Physical properties of various alloys in the forged and cast form. Applications.

3-258. Second Hatfield Memorial Lecture; Steels for Use at Elevated Temperatures. C. Sykes. *Journal of the Iron and Steel Institute*, v. 156, July 1947, p. 321-338.

Properties of large forgings in ferritic steel, steels of the R.ex78 type, and large austenitic steel forgings.

3-259. Bibliography on Creep and Heat Resisting Steels (Covering the Period 1937 to 1947). *Journal of the Iron and Steel Institute*, v. 156, July 1947, p. 338-369.

Bibliography compiled in connection with paper on steels for use at elevated temperatures, by C. Sykes.

3-260. The Fatigue Strength of Some Tin-Antimony-Copper and Other Tin-Base Alloys. P. G. Forrester, L. T. Greenfield and R. Duckett. *Metallurgia*, v. 36, July 1947, p. 113-117.

Fatigue strengths of these alloys increase with increasing antimony and copper, but the effect of solid-solution antimony and eutectic copper is much greater than of either element in the form of massive compounds.

3-261. Carbon-Molybdenum Steel for Steam Pipes. L. Rotherham. *Metallurgia*, v. 36, July 1947, p. 154-156.

In relation to carbon steel, the carbon-molybdenum steel has advantageous creep resistance in the higher steam temperature ranges. On the other hand it has a lower ductility, which makes care essential in its fabrication and installation. Incorporation of 0.5% chromium in the carbon-molybdenum steel is suggested.

3-262. Choosing Heat Resisting Materials. E. Barber. *Machinery Lloyd (Overseas Edition)*, v. 19, July 19, 1947, p. 87-90.

Problems involved, and conditions and applications to be taken into consideration in choosing heat resisting materials.

Section 3. For additional annotations indexed in other sections, see: 2-172-175-188-195; 4-91-92-99; 5-53-56; 6-184-199-210; 7-312; 9-100-101-109; 11-126; 18-144-151-154-157-169-170-176; 19-258-269-273; 20-461-480; 23-261.

4 STRUCTURE — Metallography & Constitution

4-90. Sur la Determination Roentgenographique de la Deformation des Monocristaux dans les Metaux Polycristallins. (X-Ray Determination of Deformation of Monocrystals in Polycrystalline Metals.) Adela Kochanovska. *Revue de Metallurgie*, v. 43, July-Aug. 1946, p. 192-196; discussion, p. 196-197.

Main object of this investigation was to show the possibility of determining changes in the shape of the elementary cells in polycrystalline metals. Characteristic magnitudes of such changes.

4-91. New Physico-Chemical Phenomena in the Deformation and Mechanical Treatment of Solids. P. Rehbinder. *Nature*, v. 159, June 28, 1947, p. 866-867.

Summarizes report on wartime advances in the U.S.S.R. presented at general meeting of the Academy of Sciences in July 1946. Of special interest are two effects resulting from the penetration of surface-active substances into microcracks, retarded elastic deformation in mica crystals, and structural changes on plastic deformation of metals.

4-92. Intercrystalline Cohesion and the Stress-Rupture Test. H. H. Bleakney. *American Society for Testing Materials Preprint 34*, 1947, 15 p.

Existing theories of intercrystalline cracking are stated, and criticized in the light of accumulated evidence. A hypothesis is suggested for certain phenomena and this hypothesis is used as a basis for planning a research problem. 33 ref.

4-93. La Structure des Surfaces Polies Mécaniquement et Electrolytiquement. (Structure of Mechanically Polished and Electropolished Surfaces.) H. Raether. *Métaux et Corrosion*, v. 22, Jan. 1947, p. 2-17.

Differences in the crystal structure of mechanically polished and electropolished surfaces are accentuated by use of electron diffraction or electron microscopy.

4-94. L'Existence de Phénomenes de Retard a la Solidification pour l'Aluminium Raffiné a 99.99% et son Application a la Préparation de Cristaux Uniques. (Existence of Solidification Delay Phenomena in 99.99% Pure Aluminum and Their Application in the Production of Single Crystals.) Paul LaCombe and Louis Beaujard. *Métaux et Corrosion*, v. 22, Jan. 1947, p. 18-19.

The existence of solidification delay or superfusion phenomena in 99.99% pure aluminum. Attempts to produce large aluminum crystals were completely successful. Method used.

4-95. The Recrystallization Properties of Aluminum-Magnesium Alloys and Their Effects on the Corrosion Characteristics. W. Bungardt and H. Rohde. *Headquarters Air Materiel Command, Wright Field, Translation F-TS-1878-RE*, May 1947, 4 p.

Results of metallographic analysis of the structure of Al-Mg alloys after recrystallization. Effects of cold and heat hardening methods, annealing temperature, and annealing time on grain size. (From report of *Deutsche Versuchsanstalt für Luftfahrt, E.V., Berlin-Adlershof.*)

4-96. Sur l'Etat d'Equilibre des Solutions Solides. (The State of Equilibrium of Solid Solutions.) Pierre Laurent. *Comptes Rendus*, v. 224, May 12, 1947, p. 1431-1433.

A theoretical study of the mechanism of precipitation in supersaturated solid solutions.

4-97. Sur la Structure de l'Eutectique des Fontes Grises. (Concerning the Eutectic Structure of Gray Irons.) Albert Portevin and Henri Laplanche. *Revue de Métallurgie*, May-June 1946, p. 129-131.

Graphitic eutectic formations in gray irons. Photomicrographs illustrate the various types of eutectics.

4-98. Remarques sur l'Essai Macrographique de l'Aluminium et de ses Alliages. (Remarks on Macrographic Tests on Aluminum and Its Alloys.) J. Hérenguel and F. Santini. *Revue de Métallurgie*, May-June 1946, p. 132-136.

Segregation in aluminum and its alloys.

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Notables at the Metal Show

Some of the Important Personalities Who Will Receive Awards, Present Special Lectures, or Direct Other Activities of the National Metal Congress

A GALAXY of medals, awards, prizes, memorial lectures, and other honors sponsored by the four cooperating societies constitute some of the leading attractions of the National Metal Congress; the names involved might well be a selection from a metallurgical "Who's Who".

A.S.M. AWARDS

Top awards of the American Society for Metals are the Albert Sauveur Achievement Medal, the Gold Medal, the Medal for the Advancement of Research, and the Henry Marion Howe Medal. Of these the Howe Medal is the oldest; it was established in 1923 and is awarded annually to the author of the paper of highest merit published in the A.S.M. *Transactions*. The man who will receive the Howe Medal at the Society's annual banquet on Thursday, Oct. 23, is W. A. Pennington, chief chemist and metallurgist of Carrier Corp. The title of his paper, published in Volume 37 of *Transactions* for 1946, is "A Mechanism of the Surface Decarburization of Steel".

Dr. Pennington received his Ph.D. degree from Iowa State College and served as head of the department of mathematics at Union College, later joining American Rolling Mill Co. as research engineer. After some time at Mellon Institute as an industrial fellow, he left to take his present position at Carrier Corp.

The Albert Sauveur Achievement Award, established in 1934 to perpetuate the memory of one of America's most famed and best known professors, will be presented to F. P. Zimmerli, chief engineer of Barnes-Gibson-Raymond Division of the Associated Spring Corp. Details of Mr. Zimmerli's career and the basis for presentation of the award were announced in the August issue of *Metals Review* on page 23.

The Gold Medal of the American Society for Metals was established in 1943 "for outstanding metallurgical knowledge and great versatility in the application of science to the metal industry, as well as exceptional ability in the diagnosis and solution of diversified metallurgical problems". The Gold Medal is not necessarily an annual award, and when it is presented to C. H. Mathewson, professor of metallurgy, Yale University, at Chicago, he will be only the third recipient of this honor.

Dr. Mathewson is widely known for his studies on constitution of alloys, crystallography and recrystallization of metals. Outstanding accomplishments named in the citation that accompanies the medal include the proposal of a new mechanism of flow in 1916; the basic thinking that led to the invention of a series of zinc alloys for die casting and for rolling; development of a complete series of white gold alloys for the jewelry trade; research on slip and twinning in crystals.

Dr. Mathewson has been an instructor and a professor at Yale since 1907, and has also served for 30 years as consulting metallurgist for the New Jersey Zinc Co. He delivered the Campbell Memorial Lecture in 1943. He is a past president of the A.I.M.E. and received that society's James Douglas Gold Medal in 1932.

The fourth important award is the Medal for the Advancement of Science, also established in 1943, at the same time as the Gold Medal. This honor is intended for a metal industry executive who has sponsored research and development and furthered financial support for such advances in the metallurgical arts and sciences.

Charles R. Hook, president of the American Rolling Mill Co., was a logical selection for this honor. Equipped with a high school education, he started as a workman in a small rolling mill and worked his way up to the position of night superintendent of Armco in 1902. In a long but steady climb, he reached the presidency of the company in 1930. Mr. Hook served as chairman of the American Steel Mission which was sent to England in 1942. He is a director of a number of other well-known corporations.

CAMPBELL LECTURE— MILLER MEMORIAL MEDAL

Augustus B. Kinzel, vice-president of the Electro Metallurgical Co. and of Union Carbide and Carbon Research Laboratories, Inc., will be the recipient of a double honor during the Metal Congress. On Wednesday morning, Oct. 22, he will present the Edward

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FOUR A.S.M. MEDALISTS

C. H. Mathewson, Professor of Metallurgy at Yale University, Will Receive the Third A.S.M. Gold Medal

F. P. Zimmerli, Chief Engineer of Barnes-Gibson-Raymond, Was Selected for the Sauveur Achievement Award

The A.S.M. Medal for the Advancement of Research Will Be Presented to Charles R. Hook, President, American Rolling Mill Co., and Prominent Industrialist

W. A. Pennington, Chief Chemist and Metallurgist of Carrier Corp., Has Been Awarded the Henry Marion Howe Medal for the Best Paper in the Transactions

4-99. The Effect of Changes in Condition of Carbides on Some Properties of Steel. J. B. Austin. *Transactions of American Society for Metals*, v. 38, 1947, p. 28-69.

Types of chemical bond and the structure of cementite; variation in carbon content; replacement of carbon and of iron by other elements; variation of composition during annealing or tempering; composition of carbide formed on isothermal transformation; effect of composition on properties of carbide and matrix; and effect of carbide composition on the properties of steel. 30 ref. (1946 Edward DeMille Campbell Memorial Lecture.)

4-100. A Low-Temperature Transformation in Lithium. Charles S. Barrett. *Physical Review*, v. 72, Aug. 1, 1947, p. 245.

An X-ray diffraction study of a transformation at −196° C., which is induced by plastic deformation. The transformation to the face-centered cubic form is accompanied by a series of audible clicks, as in the twinning of tin or magnesium, and by the formation of martensite. By analogy it may be concluded that the transformation goes by abrupt shear movement in small isolated regions.

4-101. Decarburization During Annealing of Malleable Iron. H. A. Schwartz and James Hedberg. *Transactions of American Society for Metals*, v. 39, 1947, p. 61-70; discussion, p. 70-72.

A metallographic study of the structure of cast iron before and after annealing.

4-102. An X-Ray Study of the Effect of High Hydrostatic Pressures on the Perfection of Crystals. Louis Rosen. *Transactions of American Society for Metals*, v. 39, 1947, p. 713-722; discussion, p. 722-724.

Powdered sodium chloride and powdered aluminum were subjected to hydrostatic pressures of 12,300 atmospheres in oil for at least 1.7 hr. X-ray diffraction patterns were compared with unpressed material. The pressed specimens showed increased resolving power and a slightly smaller lattice parameter. The effect can be explained by assuming that the crystals of the original specimens contained imperfections whose dimensions were only a few atomic diameters and that the high hydrostatic pressures caused viscous flow which tended to fill in the "holes". 14 ref.

4-103. Transformations in Krupp-Type Carburizing Steels. A. R. Troiano and J. E. DeMoss. *Transactions of American Society for Metals*, v. 39, 1947, p. 788-798; discussion, p. 798-800.

The transformation characteristics of a low-carbon and high-carbon Krupp-type carburizing steel. Austenitizing temperatures approximate those of commercial practice. An X-ray diffraction method for obtaining A_{cm} in the high-carbon steel and also for determining the carbon content of austenite in the presence of undissolved carbides. The general transformation features in terms of the behavior of other alloy steels. 10 ref.

4-104. The Distribution of Microhardness Within a Single Metallic Grain. A. A. Bochvar and O. S. Zhadaeva. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 4, 1947, p. 419-424. (In Russian.)

Microhardness tests on single grains of copper, brass, and aluminum. Random microhardness tests may show a wide spread of values within a single grain, but hardness values obtained along any particular crystallographic plane show very little spread.

4-105. On the Texture of Condensed Layers of Metals. M. M. Umanskii and S. T. Konobevskii. *Journal of Experimental & Theoretical Physics (U.S.S.R.)*, v. 17, no. 5, 1947, p. 408-415. (In Russian.)

An orientation of crystallites varying from point to point has been found to exist and has been determined in thin layers of variable thickness. The relation between orientation and the direction of the molecular ray. A hypothetical mechanism of condensation.

4-106. Structure of Retained Austenite in Plain Carbon Steels. W. J. Wrazej. *Nature*, v. 160, July 19, 1947, p. 93.

Retained austenite in quenched plain carbon steels should be regarded as a face-centered tetragonally distorted structure and not face-centered cubic.

4-107. The Dimensional Stability of Steel. Part III. Decomposition of Martensite and Austenite at Room Temperature. B. L. Averbach, M. Cohen, and S. G. Fletcher. *American Society for Metals Preprint No. 8*, 1947. (To be published in *Transactions* for 1948.)

Decompositions were measured in a plain carbon toolsteel and a ball-bearing steel by observing dimensional changes during aging. Martensite contractions were simply additive. An equation has been fitted to the basic reaction curve in order to predict the dimensional behavior of martensite. Retained austenite decomposes isothermally at room temperature causing an increase in length. Tempering decomposes some austenite, but the reaction is not additive. Rolling direction had little effect but interrupting the hardening quench above room temperature markedly influenced the behavior of the retained austenite.

4-108. Acicular Transformations in Alloy Steel. Edward A. Loria. *American Society for Metals Preprint No. 9*, 1947, 16 p. (To be published in *Transactions* for 1948.)

Data of a fundamental nature on the acicular structure occurring within the intermediate isothermal transformation range of two alloy steels containing appreciable amounts of a number of carbide-forming elements.

4-109. The Location of Alloying Metals in White Cast Iron. H. A. Schwartz and James Hedberg. *American Society for Metals Preprint No. 13*, 1947, 8 p. (To be published in *Transactions* for 1948.)

An attempt to determine the distribution of metallic alloying elements in white cast iron between cementite and ferrite during freezing and cooling. Electrolytic methods were used to separate the two phases. The distributions of molybdenum, chromium, nickel, and manganese were studied. The results are believed to be of value for the study of the mechanism of retardation or acceleration of graphitization by certain elements.

4-110. Graphitization of Steel at Elevated Temperatures. A. B. Wilder and J. D. Tyson. *American Society for Metals Preprint No. 14*, 1947, 17 p. (To be published in *Transactions* for 1948.)

The stability of 93 different types of steel at 900, 1050 and 1200° F. is being evaluated over a period of 11 years. Welded samples are included to determine the susceptibility of the steels to graphitization. Results obtained in an examination of 38 steels for evidence of graphite formation after exposure for 10,000 hr. indicate that addition of molybdenum, phosphorus, nickel, and vanadium does not insure freedom from graphite formation.

4-111. Concept of the Hydrogen Potential in Steam-Metal Reactions. Carl A. Zapffe. *American Society for Metals Preprint No. 15.* (To be published in *Transactions* for 1948.)

Thermodynamic study of numerous reactions of metals and alloys with moisture. The hydrogen potentials provide a basis for calculating the liability of the various metal systems to hydrogen pickup from the moisture reaction. Calculations for iron, steel, stainless steel, nickel, chromium, manganese, silicon, aluminum, and magnesium. Conditions over a wide range of temperature, and a wide range of humidity and steam pressure yield calculations which explain numerous metallurgical phenomena.

4-112. The Distribution of Oxygen and Nitrogen in an Alloy Steel Ingot. C. F. Sawyer, J. W. Spretnak, and G. Derge. *American Society for Metals Preprint No. 26*, 1947. (To be published in *Transactions* for 1948.)

The distribution in a 26-in. x 26-in. ingot of S.A.E. 4335 steel was studied by means of the vacuum fusion method of analysis. Required sample size to determine the oxygen and nitrogen contents in a given position in the ingot with a given degree of precision.

Section 4. For additional annotations indexed in other sections, see: 1-94; 2-175-182-186-193; 3-212-213-216-220-221-225-237-260; 6-179-180-191; 9-86-101; 11-101-114-117-119-122-128-130; 18-143-161-172-174-176; 19-268-274; 20-480; 22-389-416.

5 POWDER METALLURGY

5-52. Low Versus High Pressure in Making Cemented Carbide Tools. Anton Niedzwiedski. *Metal Progress*, v. 52, July 1947, p. 104.

Results of prewar experience in Poland indicate the superiority of high pressure pressing.

5-53. Sur la Cinetique de l'Oxydation de l'Aluminium en Poudr. (Kinetics of Oxidation of Aluminum Powder.) Haldun N. Terem. *Comptes Rendus*, v. 224, May 12, 1947, p. 1351-1353.

Oxidation of powdered 250 to 300 mesh 99.99% aluminum was investigated at temperatures of 550 to 1050° C. in moist and dry air. Results do not agree completely with the Valensi law of oxidation, but do conform to Arrhenius' law. The rate of oxidation and point at which an inhibiting layer of aluminum forms.

5-54. Sintered Iron Shell Bands. *Iron and Steel*, v. 20, July 1947, p. 370.

Production of shell driving bands in Germany by a powder metallurgy process.

5-55. Powder Metallurgy. Part I. *Metal Industry*, v. 71, July 11, 1947, p. 27, 32.

A review of papers presented at recent symposium of Iron and Steel Institute.

5-56. Improved Engineering Properties of Parts Made From Iron Powders. Claus G. Goetzel. *Product Engineering*, v. 18, Aug. 1947, p. 115-119.

The development of better properties through the various procedures which have been and are being used.

5-57. Powder Metallurgy. Part II. *Metal Industry*, v. 71, July 25, 1947, p. 70, 73.

Magnetic powders and products including dust cores, carbonyl iron, Fe-Ni-Al magnets.

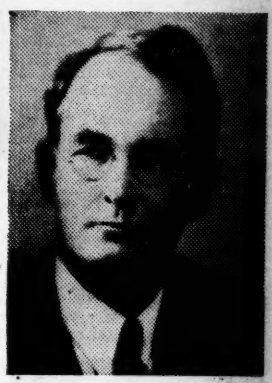
Section 5. For additional annotations indexed in other sections, see: 6-182; 20-415; 22-421; 27-163.

Special Lecturers and Prominent Speakers

A. B. Kinzel Will Give the A.S.M. Campbell Lecture and Also Receive the A.W.S. Miller Medal

G. S. Mikhalapov (Left, Below) of Air Reduction Sales Co. Will Give the Adams Lecture Before the Welding Society; and Leslie W. Ball (Right, Below) Is the Industrial Radium and X-Ray Society's Lester Lecturer

Robert F. Bacher



P. W. Bridgman

Robert F. Bacher of the Atomic Energy Commission, Will Be the Banquet Speaker While an Informal Dinner Will Honor Physicist P. W. Bridgman

DeMille Campbell Memorial Lecture before the annual meeting of the American Society for Metals, and next day he will receive the Samuel Wylie Miller Memorial Medal at the American Welding Society's banquet.

So wide and varied are Dr. Kinzel's metallurgical talents that the subject of the Campbell Lecture (not yet announced) might be anything from some phase of the testing of metals, to welding, physical chemistry of steelmaking, ferro-alloys and alloy steels, or even applied mechanics.

Dr. Kinzel has been with the Union Carbide organization since 1926. His A.B. degree was granted by Columbia University in 1919, his engineering degree from M.I.T., and a "D.Met. Ing." from University of Nancy, France, in 1922. Here he also received a D.Sc. in 1933.

Dr. Kinzel is currently a director of both the A.W.S. and the A.I.M.E. He is chairman of the Engineering Foundation Board as well as chief consultant in metallurgy to the Los Alamos Laboratories and the Argonne National Laboratories of the Atomic Energy Commission.

OTHER A.W.S. HONORS

The second American Welding Society medal (in addition to the Samuel Wylie Miller Memorial Medal) is the Lincoln Gold Medal; its recipient has not yet been announced.

Also introduced during the Welding Society banquet will be the winners of a contest held in conjunction with the Resistance Welder Manufacturers Association. In the industrial section first prize for the best paper will be presented to J. Heuschkel of Westinghouse Electric Corp.; second prize to D. Bruce of Johnston, McPhee and Johnston; and third prize to H. J. Grover and L. R. Jackson of Battelle Memorial Institute.

First prize for the best paper emanating from a university source will go to W. F. Hess, T. B. Cameron, D. J. Ashcraft and F. J. Winsor; and second prize to R. C. McMaster and F. C. Lindvall.

ADAMS LECTURE

The Adams Lecture of the American Welding Society, which will follow the presentation of medals and prizes on Monday evening, will be given by G. S. Mikhalapov, manager of apparatus research department for the Air Reduction Sales Co. Although his degree was in electrical engineering (M.I.T., 1926), Mr. Mikhalapov became interested in welding in 1933 and spent over a year in studying practices, methods and applications. For the next five years he was welding engineer for Heintz Mfg. Co., then divided his time until 1944 between Baldwin Locomotive Works as consulting engineer on welding and allied problems, and Taylor-Winfield Corp. as director of research and development. During this time he also surveyed aircraft practices in spot welding of aluminum alloys and prepared an emergency war standard adopted by the American Welding Society. Another project during these years was supervision of welding research for the War Metallurgy Committee.

Direct supervision of some 31 welding research projects conducted in industrial and educational laboratories throughout the country was a full-time job in 1944 and part-time until 1946. In December 1944 he took his present position with Air Reduction Sales Co. He also found time to serve as member Secretary of the Navy to investigate of the sub-board appointed by the the designs and methods of construction of welded steel merchant vessels, and to serve on various A.W.S., A.S.M and A.S.T.M. committees.

LESTER LECTURE

Highlight of the American Industrial Radium and X-Ray Society program will be the Lester Lecture to be delivered Thursday afternoon at 2:00 p.m. Speaking on "Nondestructive Testing in the Design, Manufacture, and Evaluation of Naval Ordnance", Leslie W. Ball, chief of the mechanical evaluation division of the Naval Ordnance Laboratory, will describe the application of nondestructive test methods developed in one of the most complete laboratories of its kind in the country.

Mr. Ball is a graduate of the Sir Lawrence Bragg School of Physics, and from 1937 to 1942, as an employee of the Canadian Government, he was largely responsible for radiographic methods and standards, and training of personnel. After several years as assistant technical director for Triplett & Barton, Inc., in work closely associated with the West Coast aircraft industries, he joined the Naval Ordnance Laboratory in 1946. As chief of the mechanical evaluation division, he is responsible for the materials, ammunition and explosives, design and simulation, and instrumentation and small mechanisms subdivisions.

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6 CORROSION

6-165. Corrosion Testing Facilities Expanded at Kure Beach. Richard K. Lotz. *Steel*, v. 121, July 14, 1947, p. 88-90, 92, 130, 134.

Results of sea-water corrosion testing of nickel alloys, nickel and chromium steels, and magnesium alloys. Relative corrodibility of atmospheres at 20 locations throughout the world.

6-166. Tests for Hot Water Resistance of Tank Enamels. Dwight G. Moore and William N. Harrison. *Journal of the American Ceramic Society*, v. 30, July 1, 1947, p. 220-226.

Resistance of a representative group of commercial enamels was measured by three types of test: loss of gloss after periods up to several hours in a conventional autoclave with distilled water; loss of gloss after one day to two weeks in apparatus which kept the specimens in contact with constantly changing, boiling distilled water; and loss in thickness after periods up to 5000 hr. in a modified autoclave with circulating aerated tap water under pressure.

6-167. Influence des Impuretés sur la Corrosion du Plomb. (Influence of Impurities on the Corrosion of Lead.) Henri Guiter. *Bulletin de la Société Chimique de France*, Jan-Feb. 1947, p. 74-76.

All of the investigated impurities, with the exception of mercury, increased the rate of lead corrosion in nitric acid; the rate decreases when the concentration of the impurities is lowered.

6-168. Mechanism of the Action of Inhibitors During the Dissolution of Iron by Acids. V. A. Kuznetsov and Z. A. Iofa. *Journal of Physical Chemistry (U.S.S.R.)*, v. 21, no. 2, 1947, p. 201-214. (In Russian.)

Influence of a series of organic compounds on the rate of solution of pure iron in hydrochloric acid. Results indicated by polarization curves. 29 ref.

6-169. Acid Dichromate Treatment for Magnesium Alloys. George Black. *Products Finishing*, v. 11, July 1947, p. 42, 44, 46.

Formulation and application of above surface treatment for inhibiting the corrosion of magnesium in salt-water atmospheres.

6-170. A Survey of High-Temperature, Gas-Atmosphere Corrosion of Iron-Nickel-Chromium Alloys. Part I. James T. Gow. *Corrosion*, v. 3, July, 1947, p. 311-324.

A correlation of quantitative data from the literature on the hot-gas corrosion behavior of the heat resistant alloys especially in air and flue gases. 10 ref. (To be continued.)

6-171. The Electrical Engineer's Responsibility for Recognizing Corrosion as a Factor in the Design of Electrical Structures. M. C. Miller. *Corrosion*, v. 3, July 1947, p. 341-346.

Urges that electrical engineers utilize available information in design work in order to reduce corrosion of underground metallic structures. Common practices which result in corrosion.

6-172. Further Discussion of Paper—Chemical Corrosion Resistance of Lead. Robert L. Ziegfeld. *Corrosion*, v. 3, July 1947, p. 347-348.

Reply to H. H. Uhlig's discussion in March issue. Disagrees with some of the latter's statements concerning the danger of lead poisoning resulting from lead water pipes.

6-173. A Magnesium Anode Installation for Preventing the Corrosion of Lead Cable Sheath. H. A. Robinson and R. L. Featherly. *Corrosion*, v. 3, July 1947, p. 349-357.

Service data on a lead-sheathed cable installation. Electrical duct survey methods show that protection has been continuously maintained for nearly two years, and anode-current log gives assurance of continued protection for the life of the anodes.

6-174. The Causes and Prevention of Stress-Corrosion in Brass. J. C. Chaston. *Sheet Metal Industries*, v. 24, July 1947, p. 1395-1401, 1404.

A survey of recent theories and investigations.

6-175. Corrosion of Metals; Metals in Aircraft Engine Cooling Systems. P. F. Thompson. *Australian Council for Aeronautics, Melbourne, Australia, Report ACA-24*, May 1946, 54 p.

The theory of corrosion. A study of inhibitors and their use. An electrochemical technique for the study of corrosion problems, and details of its use in study of the growth and breakdown of metal films. The relationship of two types of corrosion to film formation on aluminum is confirmed by the discovery of hydrogen evolution on aluminum during abrasion in neutral liquids containing water. The use of a powder in studying abrasion of films on metals in electrolytes.

6-176. Report of Committee B-8 on Electrodeposited Metallic Coatings. *American Society for Testing Materials Preprint 15*, 1947, 7 p.

Results of atmospheric exposure tests on copper-nickel-chromium deposits on high-carbon steel and on electroplated lead coatings on steel.

6-177. The Dissolution of Gold in Cyanide Solutions. P. F. Thompson. *The Electrochemical Society Preprint 91-26*, 1947, 27 p.

The above process is first considered from a theoretical point of view, and then investigated experimentally. The results have value not only for the cyanidation of gold ores, but also for the information they provide concerning the corrosion of gold.

6-178. Scaling at High Temperatures in Sulphur Dioxide, Oxygen and Nitrogen-Containing Atmospheres. J. H. Nicholson and E. J. Kwasney. *The Electrochemical Society Preprint 91-28*, 1947, 10 pages.

Data on the corrosion of steel, alloy steels, cast iron, and calorized steel in sulphur-dioxide-oxygen-nitrogen atmospheres at elevated temperatures.

6-179. An Electron Diffraction Study of Oxide Films Formed on High Temperature Oxidation Resistant Alloys. J. W. Hickman and E. A. Gulbransen. *The Electrochemical Society Preprint 91-32*, 1947, 16 p.

Electron-diffraction-reflection technique is used to study the structures of the oxides which form on Alchrome-6, Worthite, stainless steels 301, 446, and alloy S588 in the temperature range 300 to 900° C. The structures found are plotted on existence diagrams as functions of time and temperature. Attempts are made to correlate them with thermodynamic data reported by other workers.

6-180. The Kinetics of Oxide Film Formation on Metals and Alloys. Earl A. Gulbransen. *The Electrochemical Society Preprint 91-29*, 1947, 30 p.

The kinetics is broken down into 11 fundamental factors. These are: time; temperature; pressure; surface preparation and passivation treatments; gas in the metal lattice; surface area; crystal orientation; gas flow; cycle oxidation; vacuum effect; and stability of the oxide film. Rate experiments on the metals aluminum, magnesium, tungsten, molybdenum, iron, and 18-8 stainless illustrate the effect of the variables.

6-181. Literature Review on Corrosion of Metals and Materials. *Battelle Memorial Institute Report No. 1 to the American Gas Association*, Feb. 1947, 29 p.

Results of a literature search. Material from 55 articles published during the past 25 years is correlated and presented in concise form. 55 ref.

6-182. Increase in the Life of a Smoke Exhaust Fan. A. F. Tagin. *Industrial Power (U.S.S.R.)*, v. 4, no. 2, 1947, p. 12-13. (In Russian.)

Proposes application of a powdered alloy containing 18% Cr, 10% C, 15% Mn, 2% Si, and 55% Fe, to the blades to prevent corrosion caused by smoke. The powder is fused by an electric arc.

6-183. Hauteur et Nature des Aspérités sur les Surfaces de Cuivre Polies Electrolytiquement. (Character of Roughness on the Surface of Electrolytically Polished Copper.) Henri Frisby. *Comptes Rendus*, v. 224, March 31, 1947, p. 1003-1005.

Investigation of electrolytically polished copper directly after removal from the bath showed much less roughness than usual. It is believed that such a surface is subject to oxidation. When left wet in the air, it became covered, in a few minutes, with several monomolecular layers of cuprous oxide.

6-184. German Theories and Accomplishments in the Field of Stress-Corrosion Cracking. Charles A. Naugle. *Headquarters Air Materiel Command, Wright Field, Technical Report F-TR-1131-ND*, June 1947, 78 p.

The period of scientific effort covered is from 1938 to 1944. Work accomplished during the critical years in Germany which closely paralleled the efforts of metallurgists in the United States.

6-185. The Scaling Behavior of High-Strength Heat Resisting Steels in Air and Combustion Gases. W. Stauffer and H. Kleiber. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 181-188.

A new apparatus and technique for carrying out scaling tests in gas mixtures. This apparatus was used for studying the effect of synthetic combustion gases with low, medium, and high sulphur contents on martensitic, ferritic, and austenitic high-strength heat resistant steels. The work was done at Escher-Wyss in Switzerland.

6-186. Sulphur Dioxide Vs. Materials of Chemical Plant Construction. W. E. Pratt. *Chemical Engineering*, v. 54, July 1947, p. 221-222, 224.

Part I of a symposium in which manufacturers of typical materials evaluate their products for services involving wet and dry SO_2 and sulphurous acid. Nickel, nickel alloys, by W. Z. Friend. Silicones, by J. A. McHard.

6-187. Corrosion and Embrittlement of Boiler Metal at 1350 Psi. Operating Pressure. L. E. Hankison and M. D. Baker. *Transactions of the A.S.M.E.*, v. 69, July 1947, p. 479-486; discussion, p. 500-503.

After seven years of operation, three 1350-psi. boilers at the Springdale Station of the West Penn Power Co. developed a type of barnacle corrosion and metal embrittlement which caused considerable apprehension regarding safety and continuous operating ability. Investigation made of the trouble and steps taken to correct it.

6-188. Experiences With Internal-Boiler-Surface Corrosion in 1450-Lb. Open-Pass Boilers at West End Station of the Cincinnati Gas and Electric Co. E. H. Mitsch and B. J. Yeager. *Transactions of the A.S.M.E.*, v. 69, July 1947, p. 487-491; discussion, p. 500-503.

Pit-type corrosion occurred in April 1940, after three years of operation without difficulty. In February 1941, the first failure by corrosion at the rolled joints of tubes occurred. This type of corrosion stopped being active about the beginning of 1942 and had not recurred up to June 1946. Conditions of operation, boiler-water concentrations, and other factors are described and compared in order to de-

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BANQUET SPEAKER

A nuclear physicist and the only scientist among the five members of the U.S. Atomic Energy Commission will be the principal speaker at the annual banquet of the American Society for Metals on Thursday, Oct. 23. Robert Fox Bacher, 41, has studied at University of Michigan, California Institute of Technology, and Massachusetts Institute of Technology, and has taught at Columbia and Cornell. At the radiation laboratory of M.I.T., he did outstanding wartime development work which ended in controlled and practical nuclear fission.

During the engineering of the first atomic bombs, Dr. Bacher was chief of the "bomb physics division" of the Los Alamos Laboratory. Then, until his new appointment to the commission, he returned to his professorship at Cornell, where he was naturally head of nuclear research.

BRIDGMAN DINNER

Practically synonymous with the subject of fracture in metals is the name of P. W. Bridgman, world-renowned Harvard professor and 1947 winner of the Nobel Physics prize. It was natural, therefore, to plan a dinner in his honor as part of the program on fracturing of metals—the two-day seminar arranged by Case Institute of Technology and sponsored by the A.S.M. The dinner will be held on Sunday, Oct. 19, at the Palmer House.

Dr. Bridgman will also speak on Sunday morning on "Fracture and Hydrostatic Pressure".

SPECIAL LECTURE COURSES

Educational lecture courses—an established feature of A.S.M. technical programs—will be presented by Clyde W. Mason, professor of metallography in Cornell University, and Owen W. Ellis, director of metallurgical research at the Ontario Research Foundation.

Dr. Mason has boiled down the subject of phyiscal metallurgy into four lectures—a pretty concentrated brew—but as an aid to its digestion they will be available in book form at the end of the course. The main ideas, terms, and general principles underlying the behavior of metals will be summarized, with crystalline nature and phase diagrams of alloys as keys to their relationships.

A graduate of the University of Oregon, Professor Mason obtained his Ph.D. from Cornell University in 1924, where he is now professor of metallography in the School of Chemical and Metallurgical Engineering. He has served as chairman of the A.S.M. Educational Committee and on the A.F.A.-A.S.T.M. Committee on Graphite in Gray Iron.

The second lecture course on "Copper and Copper Alloys" will be presented in three sessions. Owen W. Ellis, the lecturer, has had a varied career, although he has been director of metallurgical research at Ontario Research Foundation now for a good many years. He received his early education, his B.Sc. and M.Sc. degrees in England, and then came to Canada as assistant professor of metallurgical engineering at University of Toronto. In 1925 he migrated to the United States for a year as research fellow at Mellon Institute, and three years as research metallurgist at Westinghouse. He is a past national trustee of the American Society for Metals.

TEN-YEAR SECRETARY

Following the practice of honoring secretaries of A.S.M. chapters for continuous service, J. H. Birdsong, who has completed ten years as secretary of the Buffalo Chapter, will be the guest of the society during the week of the National Metal Congress. Mr. Birdsong has been vice-president of Buffalo Testing Laboratories since 1932, a firm of analytical and consulting chemists and metallurgists. Before that he was chief chemist and metallurgist of Pratt & Letchworth Co.

The Reviewing Stand

SOUNDING OUT *Metals Review* readers some time ago, we found that certain suggestions for improvment cropped up with significant regularity. These suggestions were listed in last month's "Reviewing Stand", along with a brief explanation of how *Metals Review* format was changed last January to provide the smaller page size requested and to print the Metal Literature Review on one side of the page only for convenient filing. Other reader requests required almost as much discussion, argument, study and final compromise as the negotiations of diplomats (but without the final deadlock!).

The request for more detailed abstracts, for instance, was most disconcerting because it was in direct variance with the purpose and function of the Review of Metal Literature. The articles and publications covered are *annotated,* not abstracted; the annotations must be brief; they are designed to help the busy practising metallurgist select his reading; they are not substitutes for reading of the article.

Yet many readers apparently wanted something more than this. How to give it to them without violating the functions of the Literature Review was solved by a plan which has now been in operation for seven months with decided success. This is the publication of correlated abstracts prepared by an expert in a specific field each month. Based on the Literature Review and citing sources by code number, these articles are critical surveys of last year's literature in a specific metallurgical field, with emphasis on the more important developments. Fields covered in these surveys since January are heat treating; nonferrous metals; machining; foundry practice; testing and inspection; cleaning, finishing and electroplating; welding; design and industrial applications of metals. Future issues will cover ferrous metals; rolling, forging and forming; and instruments and control; while in January 1948 a year's development in heat treating will again be surveyed.*

Used in conjunction with the Review of Metal Literature, these annual surveys of the important metallurgical fields provide a concise, complete and useful picture of the kaleidoscopic progress of technology.

Wanted—Hard Facing Material

A manufacturer of equalizers for locomotive engine trucks fabricated from 1¼-in. carbon steel stock is having trouble with wear at the end of the bar where it rests in a hardened wear seat plate (Brinell 293 to 321). This correspondent would like to apply a hard surfacing material or antifriction composition to the point where the wear occurs, and is looking for a source of a suitable material.

It should be noted that considerable impact is transmitted to the bar through the journal box on which the ends of the equalizer rest. Also a material is desired that can be applied with the ordinary equipment in a welding department.

Any suggestions will be gladly passed on. M. R. H.

*The current issue omits a survey article in order to print complete details and programs of the important National Metal Congress and Exposition.

termine the causes of corrosion or to determine the factors responsible for arresting it.

6-189. Wall-Tube Corrosion in Steam-Generating Equipment Operating Around 1300 Psi. F. G. Straub. *Transactions of the A.S.M.E.*, v. 69, July 1947, p. 493-499; discussion, p. 499-503.

Several instances of boiler-tube failures of brittle and nonbrittle types. Brittle failure may be caused by the presence of dissolved oxygen in the feedwater in the absence of a suitable oxygen scavenger in the boiler water. The nonbrittle type was caused by caustic attack.

6-190. Corrosion by Chlorine and by Hydrogen Chloride at High Temperatures. M. H. Brown, W. B. Delong, and J. R. Auld. *Industrial and Engineering Chemistry*, v. 39, July 1947, p. 839-844.

Results of short-time exposure of a number of common metals and alloys to dry hydrogen chloride and to dry chlorine at elevated temperatures. The effect on corrosion of dilution of these gases with air, sulphur trioxide, or water vapor was also investigated.

6-191. Surface Layers on Steel in Natural Gas Condensate Wells. Norman Hackerman and D. A. Shock. *Industrial and Engineering Chemistry*, v. 39, July 1947, p. 863-867.

Micrographic studies of coupons exposed in the well-head have led to a means of classification and prediction of the corrosive character of condensate gas wells. A noncorrosive type of well has been found in which the surface layer formed on steel is thin, adherent, and apparently nonporous. An explanation is offered on the basis of the presence of an inhibitor in the hydrocarbon phase.

6-192. Nitrogen-Containing Organic Inhibitors of Corrosion. Shih-Jen Ch'Iao and Charles A. Mann. *Industrial and Engineering Chemistry*, v. 39, July 1947, p. 910-919.

A quantitative relation between cathode potential rise upon addition of inhibitor and its inhibition efficiency. The difference in functions between nitrogen-containing organic inhibitors and cathodic inorganic inhibitors. 28 ref.

6-193. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 39, July 1947, p. 85A-86A.

Selection of materials and proper design for controlling galvanic corrosion.

6-194. Maintenance of Tubular Heat Exchangers. J. G. Housman. *Petroleum Refiner*, v. 26, July 1947, p. 89-92.

The applicability of different alloys for the reduction of corrosion and scale formation; tube-cleaning methods.

6-195. Corrosion Studies for the Petroleum Refining Industry. Part II. Factors Affecting Corrosion. F. A. Rohrman. *Petroleum Refiner*, v. 26, July 1947, p. 93-98.

(To be concluded.)

6-196. Corrosion and Preventive Methods in Katy Field. R. C. Buchan. *Petroleum Engineer*, v. 18, July 1, 1947, p. 159-160, 163, 165, 168, 171-172.

The effects of acidic-water corrosion. The use of plastic-coated pipe, and of soda ash as a neutralizing agent. The need for continued research and for field testing of alloys. Full-scale field tests are recommended as soon as corrosion is found in new fields.

6-197. Corrosion Surveys. M. E. Parker. *Petroleum Engineer*, v. 18, July 1, 1947, p. 270, 272, 274, 276-278, 280, 282, 284.

The methods used in surveying pipe lines for corrosion. A combination of protective coating and electrical protection is believed to be the best prevention.

6-198. Resistance of Several Stainless Steels to Various Corrosive Media. *Materials & Methods*, v. 26, July 1947, p. 121, 123.

A tabulation.

6-199. The Mechanism of Cavitation Erosion. Thomas C. Poulter. *Frontier*, v. 10, June 1947, p. 7-11, 28.

The mechanism is clarified by the results of the application of pressure to gases in contact with liquids and solids. Penetration of atomic and molecular hydrogen into metal and of water into glass. The presence of high-frequency vibrations from a magnetostriction oscillator has a marked effect on the cavitation erosion of gray cast iron.

6-200. Sur l'Oxydation de l'Aluminium en Atmosphere Seche. (Concerning the Oxidation of Aluminum in a Dry Atmosphere.) Nicolas Cabrera, Jean Terrien, and Jean Hamon. *Comptes Rendus*, v. 224, June 2, 1947, p. 1558-1560.

Investigations indicate that the passage of ions controls the rate of oxidation. The presence of ultraviolet light accelerates the oxidation.

6-201. The Mechanism of Corrosion of Water Pipes. Thomas M. Riddick. *Water & Sewage Works*, v. 94, July 1947, p. R149-R154.

Three empirical formulas express numerically the corrosive tendencies of water from analyses.

6-202. Plastic Insulation. J. A. Clay, Jr. *Oil and Gas Journal*, v. 46, July 26, 1947, p. 245-246, 248, 250, 253.

Used to provide protection against stray-current corrosion in oil and gas wells and piping systems.

6-203. Review of N.G.A.A. Research on Gas-Condensate-Well Corrosion. T. S. Bacon. *Oil and Gas Journal*, v. 46, July 26, 1947, p. 257-258, 260-261, 263.

Activities and accomplishments of a cooperative research project concerned with the study of corrosion in gas-condensate wells.

6-204. Les Bases Thermodynamiques de la Theorie de la Corrosion. (Thermodynamic Bases of the Theory of Corrosion.) Marcel Pourbaix. *Metaux et Corrosion*, v. 21, Oct-Nov. 1946, p. 121-129.

Mathematical formulas and electrical data relating corrosion and thermodynamic properties.

6-205. Stress-Corrosion Cracking of High-Chromium Steel (E.Zh.Z). L. A. Glikman and V. A. Stepanov. *Boiler and Turbine Construction (U.S.S.R.)*, Feb. 1947, p. 19-21. (In Russian.)

The failure of bushings on the shafts of turbines was caused by stress-corrosion cracking.

6-206. La Protection Galvanique du Fer par les Anodes en Magnesium. (Galvanic Protection of Iron by Magnesium Anodes.) Bernard J. C. Raclot. *Metaux et Corrosion*, v. 21, Feb. 1947, p. 28-30.

The properties of both zinc and magnesium; pure magnesium is found to have the highest potential. The anode is buried in a mixture of tar and paraffin within a few feet of the pipe.

6-207. Gage-Glass Condensate Cracks Metal by Pocketing at Drum Counterbore. J. A. Keeth. *Power*, v. 91, Aug. 1947, p. 78-79.

Investigation of trouble which developed after many years of trouble-free operation revealed that corrosion fatigue was responsible. The difficulty was eliminated by changing drum connections so that returning condensate diffused into the boiler water instead of remaining undiluted in the counterbore where it had caused cracking. (Abstract of paper for National Association of Corrosion Engineers, May 1946.)

6-208. Marine "Lab" Aids Corrosion Research. E. W. Feller. *Power*, v. 91, Aug. 1947, p. 90-91.

Kure Beach project.

6-209. Put Ocean in Test Tube for Corrosion Tests. *Industry and Power*, v. 53, Aug. 1947, p. 94.

Kure Beach setup.

6-210. Effects of Pressure Cycling on Physical Properties of Materials. T. C. Poulter. *Product Engineering*, v. 18, Aug. 1947, p. 81-85.

The phenomenon of cavitation erosion and the results of experimental work at Armour Research Foundation in which the effects of pressure cycling on two types of specimens were determined. Specimens of 24S-T aluminum alloy sheet were cycled 20 times to 140,000 psi. The cycled specimens showed less tendency to warp on machining than the controls.

6-211. A Survey of High-Temperature, Gas, Atmosphere Corrosion of Iron-Nickel-Chromium Alloys. Part II. James T. Gow. *Corrosion*, v. 3, Aug. 1947, p. 383-403; discussion, p. 403-405.

Survey of hot-gas atmospheric corrosion of the above alloys being conducted at Battelle Memorial Institute under the sponsorship of the Alloy Casting Institute. Considerable information from unpublished research. 10 ref.

6-212. Arsenic as a Corrosion Inhibitor in Sulphuric Acid. A. Wachter, R. S. Treseder, and M. K. Weber. *Corrosion*, v. 3, Aug. 1947, p. 406-414.

The inhibitive properties of arsenic compounds in strong sulphuric acid solutions on the corrosion of carbon steel.

6-213. Periodic Cleaning of Drill Pipe. L. R. Jackson, H. M. Banta, and R. C. McMaster. *Drilling Contractor*, v. 3, June 15, 1947, p. 50-53.

A preliminary laboratory investigation of the influence of periodic cleaning upon the corrosion-fatigue operating life of steel in salt water. The tests indicate that such cleaning does not damage drill pipe, and probably adds to its operating lifetime.

6-214. Copper-Strip Corrosion Tests. J. A. Bolt. *Oil and Gas Journal*, v. 46, Aug. 9, 1947, p. 99-100.

In determining corrosiveness of various light-oil products by current test procedures, it was observed that copper-strip corrosion manifests itself in a series of distinct colors. Degree of corrosion is correlated with the colors. Tentative sets of corrosion standards have been prepared.

6-215. Zinc-Iron Couple in Water at Elevated Temperature. George D. Lain. *Corrosion and Material Protection*, v. 4, July-Aug. 1947, p. 12-15.

The possibility of a reversal in potential of the zinc-iron couple in natural waters at elevated temperatures with emphasis on the behavior of hot-dipped galvanized steel pipe in a natural water with a total hardness of less than 60 parts per million expressed as calcium carbonate, and carrying dissolved oxygen and carbon dioxide close to the point of saturation.

6-216. Insulation of Dissimilar Metal Faying Surfaces. Bernard W. Floersch. *Corrosion and Material Protection*, v. 4, July-Aug. 1947, p. 16, 18.

Results of a series of tests to determine the optimum organic insulation necessary for protection against galvanic corrosion in various dissimilar metal contacts.

6-217. Activation of Passive Iron. W. H. Cone and Don H. Anderson. *Corrosion and Material Protection*, v. 4, July-Aug. 1947, p. 21-23.

Test for passivity, its possible causes and solution for change to active state.

6-218. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 39, Aug. 1947, p. 93A-94A.

Cathodic methods for protecting equipment from corrosion and new developments in materials.

6-219. Is Cast Iron Superior in Corrosion Resistance to Steel? R. W. White. *Materials & Methods*, v. 26, Aug. 1947, p. 82-85.

Results of comprehensive tests showed that, with the finishes involved, steel offered greatest corrosion resistance.

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Metal Show Exhibitors—Alphabetical List

A guide to products being displayed, classified under nine headings, starts on page 35

Acme Aluminum Foundry Co., Chicago. Booth 2301.
Acme Mfg. Co., Detroit. Booth 2423.
Acme Steel Co., Chicago. Booth 2424.
Acme Tool Co., New York. Booth 115.
Advance Aluminum Castings Corp., Chicago. Booth 2210.
Air Reduction Sales Co., New York. Booth 330.
Ajax Electric Co., Inc., Philadelphia. Booth 1054.
Ajax Electrothermic Corp., Trenton, N. J. Booth 1151.
Ajax Engineering Corp., Trenton, N. J. Booth 1051.
Allegheny Ludlum Steel Corp., Pittsburgh. Booth 216.
Allison Co., Bridgeport, Conn. Booth 1110.
Alloy Casting Co., Champaign, Ill. Booth 246.
Alloy Rods Co., York, Pa. Booth 1809.
Alox Corp., Niagara Falls, N. Y. Booth 141.
Aluminum Co. of America, Pittsburgh. Booth 630.
Alvey-Ferguson Co., Cincinnati, Ohio. Booth 1037.
Ameraco Industrial Specialties, Chicago. Booth 2425.
American Brakeblok Div., American Brake Shoe Co., Detroit. Booth 342.
American Brass Co., Waterbury, Conn. Booth 939.
American Buff Co., Chicago 16. Booth 1425.
American Chain & Cable Co., Inc., Bridgeport, Conn. Booths 938, 1110 and 1219. (See Page Steel and Wire Division; Andrew C. Campbell Division; Allison Co.; Wilson Mechanical Instrument Co.)
American Cyanamid Co., New York City. Booth 850.
American Emblem Co., Inc., Utica, N. Y. Booth 1521.
American Forge Div., American Brake Shoe Co., Chicago. Booth 342.
American Gas Association, New York City. Booths 610, 614, 617, 620, 710, 714, 715, 719, 720, 815, 818, 819.
American Gas Furnace Co., Elizabeth, N. J. Booth 819.
American Machine & Metals, Inc. (See Riehle Testing Machines Division)
American Manganese Steel Div., American Brake Shoe Co., Chicago Hts., Ill. Booth 342.
American Metal Market, New York City. Booth 1915.
American Smelting & Refining Co., New York City. Booth 1041. (See Federated Metals Division)
American Society for Metals, Cleveland. Booth unassigned.
American Society for Metals, Chicago Chapter. Booth unassigned.
American Wheelabrator & Equipment Corp., Mishawaka, Ind. Booth 910.
American Zinc Products Div., Greencastle, Ind. Booth 1903.
Ampco Metal, Inc., Milwaukee. Booth 110.

The National Metal Exposition, to be held in the International Amphitheatre, Chicago, will be open from 12 noon until 10:30 p.m., Sat., Sun., Mon., Tues., and Wed., Oct. 18, 19, 20, 21, and 22; and from 10:00 a.m. to 6:00 p.m. on Thurs. and Fri., Oct. 23 and 24. Admission is by invitation card (distributed by exhibitors), by membership card in any of the four cooperating societies, or by payment of $1.00 registration fee which entitles the guest to a badge good for the entire time of the Congress and Exposition.

Applied Research Laboratories, Glendale, Calif. Booth 2516.
Arcos Corp., Philadelphia. Booth 1730.
Arwood Precision Casting Corp., Brooklyn, N. Y. Booth 932.
Aurora Equipment Co., Aurora, Ill. Booth 308.
Aurora Metal Co., Aurora, Ill. Booth 2009.
Austenal Laboratories, Inc., New York City. Booth 149.
Automatic Bending Co., Chicago. Booth A-1815.
Automatic Transportation Co., Chicago. Booth 740.
Automotive Industries, Philadelphia. Booth 2808.
Baker & Co., Inc., Newark, N. J. Booth 1505.
Baldwin Locomotive Works, Philadelphia. Booths 329 and 1042.
Bastian-Blessing Co., Chicago. Booth 108.
Bausch & Lomb Optical Co., Rochester, N. Y. Booth 1422.
Behr-Manning Corp., Troy, N. Y. Booth 1711.
Bell & Gossett Co., Morton Grove, Ill. Booth 421.
Blakeslee & Co., G. S., Chicago. Booth 1338.
Bradley Washfountain Co., Milwaukee. Booth 2707.
Braeburn Alloy Steel Corp., Braeburn, Pa. Booth 1032.
Brake Shoe and Castings Div., American Brake Shoe Co., New York City. Booth 342.
Brickseal Refractory Co., Hoboken, N. J. Booth 1917.
Bridgeport Brass Co., Bridgeport, Conn. Booth 1251.
Bristol Co., Waterbury, Conn. Booth 339.
Brown Instrument Co., Philadelphia. Booth 1138.
Bryant Heater Co., Cleveland. Booth 710.
Budd Co., Induction Heating Div., Detroit. Booth 935.
Buehler, Ltd., Chicago. Booth 1615.
Burdett Mfg. Co., Chicago. Booth 1426.
Burkay Co. (See A. O. Smith Corp.)
Cambridge Wire Cloth Co., Cambridge, Md. Booth 2640.
Campbell Division, Andrew C., American Chain & Cable Co., Bridgeport, Conn. Booth 1110.
Carboloy Co., Inc., Detroit. Booth 1142.
Central Scientific Co., Chicago. Booth 1509.
Champion Rivet Co., Cleveland. Booth 2708.
Chayes Dental Instrument Corp., New York City. Booth 2416.
Cherry Rivet Co., Los Angeles. Booth 1223.
Chicago Steel Foundry Co., Chicago. Booth 310.
Chilton Co., Philadelphia. Booth 2808.
Cincinnati Milling and Grinding Machines, Inc., Cincinnati 9, Ohio. Booth 2702.
Cities Service Oil Co., New York City. Booth 230.
Clark Instrument, Inc., Dearborn, Mich. Booth 1816.
Cleveland Crane & Engineering Co., Wickliffe, Ohio. Booth 1210.
Climax Molybdenum Co., New York City. Booth 2102.
Clinton Machine Co., Inc., Clinton, Mich. Booth 2725.
Columbia Tool Steel Co., Chicago Heights, Ill. Booth 1119.
Commerce Pattern Foundry and Machine Co. (See Upton Electric Furnace Div.)
Commonwealth Edison Co., Chicago. Booth 2002.
Continental Industrial Engineers, Inc., Chicago. Booth 521.
Crown Rheostat & Supply Co., Chicago. Booth 224.
Crucible Steel Co. of America, Chicago. Booth 1131.
Cullen-Friestedt Co., Chicago. Booth A-1820.
Dearborn Industrial Mfg. Co., Cicero, Ill. Booth 2005.
Delaware Tool Steel Corp., Wilmington, Del. Booth 1026.
Despatch Oven Co., Minneapolis. Booth 1921.
Detrex Corp., Detroit. Booth 2216.
Detroit Electric Furnace Division of Kuhlman Electric Co., Bay City, Mich. Booth 2916.
Detroit Testing Machine Co., Detroit. Booth 1610.
Diamond Machine Tool Co., Los Angeles, Calif. Booth 225.
Die Castings (Industrial Publishing Co.), Cleveland. Booth 639.
Dietert Co., Harry W., Detroit. Booth 1019.

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6-220. Testing Acid Resisting Steels for Their Resistance to Intercrystalline Corrosion. Siegfried Plankensteiner. *Metallurgia*, v. 36, July 1947, p. 145-148.

Report, based on experiments and tests, on the determination of the resistance to intercrystalline corrosion of austenitic chromium-nickel and chromium-nickel-molybdenum steels. A new testing liquid gives quicker and more accurate results.

6-221. Automobile Exhaust Valve Materials and Lead Attack. R. J. Brown. *Metallurgia*, v. 36, July 1947, p. 149-154.

Two forms of corrosion which are due to lead attack on automobile exhaust valve material. The ideal valve material has yet to be discovered. The problem is claimed to be one of faulty combustion rather than of faulty metallurgical technique.

Section 6. For additional annotations indexed in other sections, see: 3-198-227-233; 7-293-324-331; 8-115; 11-107; 12-148; 18-175; 19-265; 22-394.

7 CLEANING & FINISHING

7-280. Limestone Used to Neutralize Acid Wastes. A. R. Reidl. *Chemical Engineering*, v. 54, July 1947, p. 100-101.

Unique system of upflow limestone beds and aeration used by General Electric's Philadelphia Works for neutralizing the effluent from acid dipping and plating operations. Need for expensive acid pumps is thus eliminated. Experimental data regarding the proper size of the beds and the optimum rate of flow of the acid.

7-281. Preparing Steel for Porcelain Enameling. G. H. McIntyre. *Steel*, v. 121, July 21, 1947, p. 102, 112, 115, 118, 120.

Importance of good nickel flash in lowering rejects and insuring generally good enameling qualities of all types of steel. Proper nickel deposit improves bonding range of ground coat and minimizes copper beading and fish-scaling by reducing overactive oxidation characteristics of steel.

7-282. Electrolytic Polishing of Magnesium. George Black. *Metal Finishing*, v. 45, July 1947, p. 84-86.

Results of some experiments on adaptation to production processes of Jacquet's method for electrolytic polishing prior to metallographic examination.

7-283. Contributo alla Conoscenza dei Processi di Lucidatura Elettrolitica dei Metalli. (Contribution to the Study of Electropolishing Processes.) R. Piontelli, D. Porta, and L. Arduini. *La Metallurgia Italiana*, Jan-Feb. 1947, p. 3-11.

A new experimental installation for the study of electropolishing processes permitting a convenient reproduction of the anodic tension curve as a function of time and current density. The mechanism of the process, with specific reference to the influence of both composition and conditions of electrolysis. (Reprint.)

7-284. Sur l'Examen par Diffraction Electronique des Surfaces Obtenues par Polissage Electrolytique. (Examination of Electropolished Surfaces by Means of Electron Diffraction.) J. Trillat. *Comptes Rendus*, v. 224, April 14, 1947, p. 1102-1103.

Examination of surfaces polished electrolytically in a perchloric-acetic bath showed that Beilby's film, which is always present on the surfaces of mechanically polished specimens, disappears after electropolishing.

7-285. Finishing Chrysler and DeSoto Passenger Car Bodies. Bryant W. Pocock. *Products Finishing*, v. 11, July 1947, p. 24-26, 28, 30, 32, 34, 36, 38, 40.

7-286. Finishing Clinic. Allen G. Gray. *Products Finishing*, v. 11, July 1947, p. 50, 52, 54, 56, 58, 60, 62, 64, 66, 70-71.

Tests for evaluation of industrial finishes; passivating treatments for cadmium plate; temperature control of alkaline cleaning baths; reducing hydrogen embrittlement in electroplating; use of masking tape in finishing operations; proper racking in plating of aluminum.

7-287. Barrel Finishing of Metal Products. Part II. Barrel Finishing as an Intermediate Operation. H. Leroy Beaver. *Products Finishing*, v. 11, July 1947, p. 74, 76, 78, 80, 82, 84, 86.

7-288. Abrasive Blast Treatment Speeds Parts Cleaning. Arthur P. Schulze. *Tool Engineer*, v. 18, July 1947, p. 35-38.

How airless mechanical cleaning effects faster machining and improved quality.

7-289. The Self Opacification of Titanium Enamels. W. H. F. Tickle. *Sheet Metal Industries*, v. 24, July 1947, p. 1409-1413, 1419.

The theory of nuclei and opacification, and the effect of ferric oxide and other isomorphous compounds on titanium enamels. 11 ref.

7-290. The Possibilities and Limitations of Electrolytic Polishing. A. F. Brockington. *Sheet Metal Industries*, v. 24, July 1947, p. 1414-1416.

A survey of the present status of the art.

7-291. The Protection of Ships' Bottoms and the Formulation of Anticorrosive Compositions. F. Fancutt and J. C. Hudson. *Journal of the Oil & Colour Chemists' Association*, v. 30, May 1947, p. 135-158; discussion, p. 158-162.

Organization of the Marine Corrosion Sub-Committee and a survey of its researches. Procedures used and results obtained in development of improved anticorrosive compositions. Use of paints containing aluminum and other metallic pigments is tentatively recommended. 11 ref.

7-292. Teinte Grise ou Noire des Pellicules d'Oxydation Anodique sur Alliages Al-Mg Industriels. (The Gray or Black Color in Anodic Oxidation Films on Industrial Al-Mg Alloys.) J. Herenguel and R. Segond. *Métaux et Corrosion*, v. 21, Aug-Sept. 1946, p. 101-104.

The gray color of the anodic oxidation films in industrial aluminum is caused by the silicon content of the metal. This defect differs from spotting which Lacombe defined, although it appears similar.

7-293. Report of Committee D-12 on Soaps and Other Detergents. *American Society for Testing Materials Preprint 71*, 1947, 9 p.

Proposed tentative specifications for sodium bicarbonate and for borax, and proposed tentative method for total-immersion corrosion testing of water-soluble aluminum cleaners.

7-294. Mechanical Properties of Chromium Diffusion Coatings. N. S. Gorbunov, I. D. Yudin, and N. A. Izgaryshev. *Comptes Rendus de l'Academie des Sciences de l'U.R.S.S.*, v. 55, no. 5, 1947, p. 415-417. (In English.)

Some results obtained in studying the microhardness of chromium diffusion coatings on metals with different carbon contents. The layers of chromium were produced on the surface of steel and cast-iron specimens in a chlorine atmosphere. The diffusion coatings did not differ appreciably in hardness from the bulk material.

7-295. Parkerizing as an Aid to Lubrication. *Engineering Materials*, v. 5, June 1947, p. 46-51.

Use of this phosphating treatment.

7-296. Spray Finishing of Metalware M. C. Lumle. *Industrial Finishing*, v. 23, July 1947, p. 27-30, 32.

How a high-grade finish is applied in one coat to a wide variety of sizes and shapes of metalware.

7-297. Gold and Metal Leaf Applied to Fine Frames. P. C. Bardin. *Industrial Finishing*, v. 23, July 1947, p. 36-38, 40, 42.

How foundation materials are mixed; how surfaces are prepared; methods of laying gold and metal leaf; and use of specialty finishes on metal-leafed frames.

7-298. Decals Applied in Mass Production. C. F. Newburg. *Industrial Finishing*, v. 23, July 1947, p. 54, 57-58, 60, 62.

Methods of handling and applying decals to difficult and simple surfaces, all on a mass production basis.

7-299. An Alkali-Resistance Test for Porcelain Enamels. E. Skillicorn and J. E. Hansen. *Enamelist*, v. 24, July 1947, p. 16-20.

Application of simple laboratory test.

7-300. Porcelain Enameling at Western Stove Company. F. M. Burt. *Enamelist*, v. 24, July 1947, p. 21-27, 64.

Layout, procedures, and equipment.

7-301. Water Immersion Testing of Metal Protective Paints; Role of Electro-endosmosis in Water Absorption and Blistering. W. W. Kittelberger and A. C. Elm. *Industrial and Engineering Chemistry*, v. 39, July 1947, p. 876-881.

Over 90% of the total water absorbed by a linseed-oil-type paint coating, under the influence of both a concentration and a potential gradient, was transferred into the film by electro-endosmotic forces. The greater resistance to water absorption and blistering of some paint coatings may be not so much due to a greater inherent waterproofness as to an appreciably higher electrolytic resistance.

7-302. Protecting Surface Finish With Strippable Plastic Coatings. H. R. Clauser. *Materials & Methods*, v. 26, July 1947, p. 70-74.

Properties and applications of the three general types: solvent strip coatings; water-dispersion coatings; and hot-melt coatings.

7-303. Types and Characteristics of Modern Porcelain Enamels. Harold A. Knight. *Materials & Methods*, v. 26, July 1947, p. 93-98.

Preparation of the metal surface; the nickel-flash treatment; new enamel compositions; enameling aluminum; titanium steel for enameling; high-temperature ceramic coatings; and miscellaneous new applications.

7-304. No Electric Current Used in New Method of Plating Nickel and Cobalt on Metal Surface. *Steel*, v. 121, July 28, 1947, p. 84, 86, 88, 100, 102.

New coating process, called electroless plating—reported at recent American Electroplaters' convention. It is brought about by chemical reduction of a nickel or cobalt salt with hypophosphite in hot solution. Latest methods of bath purification.

7-305. Inrichting Van Spuitcabines En Spuitkasten Voor Het Bewerken Van Voorwerpen Door Middel Van Een Zandstraal. (Installation of Suction Boxes and Compartments for Sandblast Cleaning.) H. T. Hart. *Metalen*, June 1947, p. 175-180.

Directions for construction of equipment used for blast cleaning of castings and steel structures.

7-306. Full Automatic Hot Zinc Galvanizing of Tanks. Raymond F. Ledford. *Iron Age*, v. 160, July 31, 1947, p. 56-60.

Advantages of conveyerized tank-

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Dillon & Co., Inc., W. C., Chicago. Booth 943.
Distillation Products, Inc., Rochester, N. Y. Booth A-1826.
Diversey Corp., Chicago. Booth 221.
Division Lead Co., Chicago. Booth A-2635.
DoAll Co. (See DoAll Midwest Co.)
DoAll Midwest Co., Chicago. Booth 2315.
Dreis & Krump Mfg. Co., Chicago. Booth 1246.
Driver Co., Wilbur B., Newark, N. J. Booth 235.
Eastman Kodak Co., Rochester, N. Y. Booth 1226.
Ecco High Frequency Corp., North Bergen, N. J. Booth 921.
Eclipse Fuel Engineering Co., Rockford, Ill. Booth 610.
Eddystone Div. (See Baldwin Locomotive Works)
Edwards, Inc., S. H., Richmond, Calif. Booth 1902.
Electric Furnace Co., Salem, Ohio. Booth 833.
Electro-Alloys Div., American Brake Shoe Co., Elyria, Ohio. Booth 342.
Electro Refractories & Alloys Corp., Buffalo, N. Y. Booth 240.
Engineered Castings Div., American Brake Shoe Co., Rochester, N. Y. Booth 342.
Equipto Division, Aurora Equipment Co., Aurora, Ill. Booth 306.
Eutectic Welding Alloys Corp., New York City. Booth 548.
Executone, Inc., New York City. Booth 2815.
Fahralloy Co., Harvey, Ill. Booth 2408.
Fansteel Metallurgical Corp., North Chicago, Ill. Booth 2115.
Federated Metals Division, American Smelting & Refining Co., New York City. Booth 1041.
Ferro Bronze Corp., Moline, Ill. Booth 1822.
Finnell System, Inc., Elkhart, Ind. Booth 2924.
Flow (Industrial Publishing Co.). Cleveland. Booth 639.
Foundry (Penton Publishing Co.), Cleveland. Booth 209.
Foxboro Co., Foxboro, Mass. Booth 926.
Frontier Bronze Corp., Niagara Falls, N. Y. Booth 1115.
Gaertner Scientific Corp., Chicago. Booth 1517.
Gas Appliance Service Inc., Chicago. Booth 620.
General Alloys Co., Boston. Booth 640.
General Electric Co., Schenectady, N. Y. Booth 1128.
General Electric X-Ray Corp., Chicago. Booth 1128.
General Plate Division, Metals and Controls Corp., Attleboro, Mass. Booth 1817.
Gerity-Michigan Die Casting Co., Inc., Adrian, Mich. Booth 1606.
Gerrard & Co., A. J., Chicago. Booth 2006.
Globe Imperial Corp., Rockford, Ill. Booth 2110.
Goodrich Co., B. F., Akron, Ohio. Booth 1315.
Gordon Co., Claud S., Chicago. Booth 525.
Gordon Electronics, Inc., Pittsburgh. Booth 1250.
Gray Machine Co., Philadelphia. Booth 1814.
Green Electric Co., W., New York City. Booth 349.
Greenlee Foundry Co., Cicero, Ill. Booth 2830.
Grobet File Co. of America, Inc., Chicago. Booth 2724.
H & H Research Co., Detroit. Booth 115.
Hammond Machinery Builders, Inc., Kalamazoo, Mich. Booth 142.
Handy & Harman, New York City. Booth 150.
Hardy, Inc., Charles, New York City. Booth 1618.
Harmon & Co., Chicago. Booth 1904.
Harnischfeger Corp., Milwaukee. Booth 1202.
Harper Co., H. M., Chicago. Booth 1910.
Harvey Machine Co., Inc., Torrance, Calif. Booth 1810.
Hauck Mfg. Co., Inc., Brooklyn, N. Y. Booth 1002.
Haynes Stellite Co., Kokomo, Ind. Booths 838 and 840.
Hevi Duty Electric Co., Milwaukee. Booth 135.
Hitchcock Publishing Co., Chicago Booth 2723.
Hobart Brothers Co., Troy, Ohio. Booth 906.
Holcroft & Co., Detroit. Booth 1031

galvanizing installations; makeup and other characteristics of baths for mechanized operations.

7-307. Test Shot-Blasting for Sealing Sprayed Lead Coatings. *Iron Age,* v. 160, July 31, 1947, p. 60.

Tests indicate shot-blasting will eliminate porosity of the coatings. A sprayed undercoat of one of three metals is also necessary.

7-308. Scales Finished Electrostatically. D. A. Hilliard. *Organic Finishing,* v. 8, July 1947, p. 19-21.

Methods used by Landers, Frary & Clark, New Britain, Conn.

7-309. Preparing Steel for Painting. Ivor Richards. *Organic Finishing,* v. 8, July 1947, p. 29-30.

A brief outline.

7-310. Brilliant Silver Spray. A. S. Langlotz. *Organic Finishing,* v. 8, July 1947, p. 31-33.

Procedures for applying to non-conductive services of different types.

7-311. Cleaning and Heat Treating Aluminum Alloys. W. J. Rogers, F. Carl, R. Seabury, and N. Smith. *Modern Metals,* v. 3, July 1947, p. 24-26.

An SAE publication. Previously abstracted.

7-312. Copper-Titanium Alloy Coatings on Mild Steel. Edward J. Chapin and Carle R. Hayward. *Transactions of American Society for Metals,* v. 38, 1947, p. 909-956.

Coating of mild steel with copper-titanium alloys of several compositions by the application of heat in a protective atmosphere. Compositions ranging from 5 to 37.5% were investigated. The most satisfactory coating was of approximately eutectic composition of about 25% Ti content. Observations on metallographic examination, microhardness determinations, bend, corrosion, diffusion, and nitriding. 12 ref.

7-313. Approach to Proper Method of Preparing Steel Sheets for Vitreous Enameling. D. J. Benoliel and W. J. Haring. *American Ceramic Society Bulletin,* v. 26, July 15, 1947, p. 213-214.

Development of balanced cleaner compositions; ionic aspects of surfaces; sources of surface contamination; mechanics of cleaning surfaces; prerequisites of a satisfactory cleaner.

7-314. Electrolytic Polishing; Application to Stainless Steel and Nickel Silver Cutlery. (Concluded.) H. Evans and E. H. Lloyd. *Metal Industry,* v. 71, July 18, 1947, p. 51-52.

Tests of surface finish; defects.

7-315. Briggs Adopts Special Lacquer-Drying Ovens. Joseph Geschelin. *Automotive Industries,* v. 97, Aug. 1, 1947, p. 32-33, 62.

Use of direct-fired recirculating air units for all drying operations at Detroit plant recently converted from airplane parts manufacture to automobile body assembly.

7-316. Modern Wire Pickling Practice and Plant Design. Part III. Construction of Pickling Tanks: Acid Storage. Edward Mulcahy. *Wire Industry,* v. 14, July 1947, p. 377-380.

Diagrams of acid tanks, lime tanks, rinse tanks, storage tanks, continuous systems. (To be continued.)

7-317. Principles and Applications of Metal Spraying. Howard Batsford. *Machine and Tool Blue Book,* v. 43, Aug. 1947, p. 168-170, 172-174, 176-178.

A few case histories of metal spraying applications and basic principles.

7-318. Treatments for Metal Surfaces Prior to Painting. E. F. Hickson and W. C. Porter. *Product Engineering,* v. 18, Aug. 1947, p. 128-130.

Equipment for spray chamber process and directions for treatment of steel; galvanized metal and sheet zinc; aluminum and aluminum alloys; lead; copper and brass; and magnesium alloys.

7-319. Effect of Composition, Heat Treatment, and Cold Work on the Hydrogen Embrittlement of Stainless Steel Wire During Cathodic Pickling. Carl A. Zapffe and O. George Specht, Jr. *Transactions of American Society for Metals,* v. 39, 1947, p. 193-211; discussion, p. 212.

A new test for exploring the nature of hydrogen embrittlement and the factors controlling it. Relative susceptibilities of different types of steel under conditions of equal concentration of surface hydrogen; effect of heat treatment; effect of cold work; and general progress of embrittlement with increasing charging time. 11 ref.

7-320. Acid Composition, Concentration, Temperature, and Pickling Time as Factors in the Hydrogen Embrittlement of Mild Steel and Stainless Steel Wire. Carl A. Zapffe and M. Eleanor Haslem. *Transactions of American Society for Metals,* v. 39, 1947, p. 213-237; discussion, p. 237-240.

Explores by means of the constant-rate, single-bend test, the variables that affect the hydrogen embrittlement in steel, in straight acid pickling without addition of inhibitors. Variables investigated were: composition, thermal treatment, and mechanical treatment of the steel; composition, concentration, and temperature of the acid; and pickling time. Six different acids were studied. Relationships of the seven variables.

7-321. A New Southern Stove Plant for Straightline Production. Gerald Eldridge Stedman. *Finish,* v. 4, Aug. 1947, p. 15-18, 50.

Equipment, procedures, and layout of Florence Stove Co.'s enameling plant, Lewisburg, Tenn.

7-322. Chemical Reaction in Metal Protective Paints. E. J. Dunn, Jr. *Corrosion,* v. 3, Aug. 1947, p. 374-382.

The phenomenon of metallic soap formation by reaction of the pigment with the vehicle. Different soap structures. Soap contents and acid numbers of paints and dried paint were determined for a series of pigments. Permeability of raw linseed oil films after adding various lead soaps.

7-323. Electrolytic Polishing; Theory and Practice. Joseph Mazia. *Monthly Review,* v. 34, Aug. 1947, p. 937-944.

A review. 31 ref.

7-324. M.B.V. Process; Application of a Corrosion-Resistant Aluminum Oxide Coating. R. P. Marshall. *Metal Industry,* v. 71, Aug. 1, 1947, p. 93.

Modified Bauer-Vogel process, developed by G. Eckert in 1930, produces an aluminum oxide coating on aluminum and its alloys which, although not so hard as an anodized coating, is very resistant to corrosion. New plant and alloys treated.

7-325. Wet Grinding Sheet and Strip. T. E. Lloyd. *Iron Age,* v. 160, Aug. 14, 1947, p. 65-66.

A new finishing machine which will simultaneously wet grind both sides of cut or coiled sheet or strip. This unit will grind, polish or buff carbon and stainless steel, clad metal, magnesium, aluminum, or plastics.

7-326. Finishing Is Not a Bottleneck. *Die Castings,* v. 5, Aug. 1947, p. 60-61.

Polishing, finishing, and spray painting of aluminum alloy and steel vacuum cleaner parts.

7-327. Production Clinic for Finishing Die Castings. *Die Castings,* v. 5, Aug. 1947, p. 51-53.

Application of organic finishes to zinc-base die castings, and bright dips for copper and copper alloys.

7-328. Aluminum Electropolishing Plant. Fred A. Herr. *Metal Finishing,* v. 45, Aug. 1947, p. 63-64.

The new half million dollar plant of Automatic Polishers operated in Los Angeles.

7-329. Conditioning Hot Dip Galvanizing Baths. Wallace G. Imhoff. *Steel,* v. 121, Aug. 18, 1947, p. 108, 125, 127.

Hot dip galvanizing of small articles such as nails. Factors considered are the correct revolution per minute, the proper basket load, mechanical conditions, bath temperature and metal condition.

7-330. The Enameling Industry. R. R. Danielson. *Ceramic Age,* v. 50, July 1947, p. 41-45.

Developments over past 25 years.

7-331. Finishing Clinic. Allen G. Gray. *Products Finishing,* v. 11, Aug. 1947, p. 50, 52, 54, 56, 58, 60, 62, 66, 68, 70, 72.

Importance of chromium plating under conditions of optimum throwing power; chemical treatment for improvement of corrosion resistance of zinc electroplates; recent developments in silicone resin finishes; phosphate treatments for final assembly; electropolishing of silver; highlighted finish for aluminum articles.

7-332. Electrostatic Finishing Process Doubles Production at Delta Electric. W. B. Stephenson. *Products Finishing,* v. 11, Aug. 1947, p. 40, 42, 44, 46.

Application to miscellaneous articles at Delta Electric Co., Marion, Ind.

7-333. Barrel Finishing of Metal Products. Part XII. Factors in the Barrel Finishing of Light Specific Gravity Parts. H. Leroy Beaver. *Products Finishing,* v. 11, Aug. 1947, p. 28-30, 32, 34, 36, 38.

Suggests using same techniques as for barrel finishing plastics and vegetable ivory, bone and pearl shell items.

7-334. A Protective Filming Process for Tinplate. H. R. Clauser. *Materials & Methods,* v. 26, Aug. 1947, p. 97-100.

The Protectatin process is a simple method of coating tinplate and can be applied to the plate before forming.

Section 7. For additional annotations indexed in other sections, see: 4-93; 6-166-169-183-202; 8-117; 11-128-134; 12-148; 16-101; 24-232.

8 ELECTROPLATING

8-108. Metal Distribution From a Plating Bath. J. B. Mohler and H. J. Sedusky. *Iron Age,* v. 160, July 17, 1947, p. 56-59, 144.

Some of the basic aspects of metal distribution and the factors affecting current distribution, throwing and covering power, polarization, plating range, and current density, particularly as they influence plating quality.

8-109. Engineering a Small Job-Plating Shop. A. Lakos. *Metal Finishing,* v. 45, July 1947, p. 69-70, 89.

Useful hints on promoting efficiency in a small shop.

8-110. Largest Automatic Plating Plant in the World. *Metal Finishing,* v. 45, July 1947, p. 67-68.

Fully automatic plant of an automobile manufacturer.

8-111. Metal Surfacing by Hard Chromium Plating. Edwin H. Halvorsen. *Metal Finishing,* v. 45, July 1947, p. 71-76.

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Holden Co., A. F., New Haven, Conn. Booth 550.
Holliday & Co., W. J. (See Monarch Steel Co., Inc.)
Honan-Crane Corp., Lebanon, Ind. Booth 2331.
Hones, Inc., Charles A., Baldwin, Long Island, N. Y. Booth 720.
Houdaille-Hershey Corp. (See Honan-Crane Corp.)
Houghton & Co., E. F., Philadelphia. Booth 948.
Huppert Co., K. H., Chicago. Booth 2731.
Hydraulic Press Mfg. Co., Mount Gilead, Ohio. Booth 522.
Illinois Testing Laboratories, Inc., Chicago. Booth 920.
Illinois Tool Works. (See Shakeproof, Inc.)
Industrial Bulletin, Chicago. Booth 1503.
Industrial Heating (National Industrial Publishing Co.). Booth 2829.
Industrial Press, New York City. Booth 444.
Industrial Publishing Co., Cleveland. Booth 639.
Industrial Tape Corp., New Brunswick, N. J. Booth 942.
Industry and Welding (Industrial Publishing Co.), Cleveland. Booth 639.
Intercontinental Engineers, Inc., Chicago. Booth 521.
International Nickel Co., Inc., New York City. Booth 637.
Iron Age, New York City. Booth 245.
Jackson Buff Corp., Long Island City, N. Y. Booth 1928.
Jackson Products, Warren, Mich. Booth 1909.
Janney Cylinder Co., Philadelphia. Booth 154.
Jensen Specialties, Inc., Detroit. Booth 1806.
Jones & Laughlin Steel Corp., Pittsburgh. Booth 442.
Jones Co., C. Walker, Philadelphia. Booth 2823.
Joslyn Mfg. & Supply Co., Fort Wayne, Ind. Booth 236.
Kaiser Co., Henry J. (See Permanente Products Co.)
Kelley-Koett Mfg. Co., Covington, Ky. Booth 1515.
Kemp Mfg. Co., C. M., Baltimore, Md. Booth 719.
Kennametal, Inc., Latrobe, Pa. Booth 2613.
Kern Co., John A., Chicago. Booth 2923.
Kerr Mfg. Co., Detroit. Booth 2625.
Kewaunee Mfg. Co., Adrian, Mich. Booth 1709.
King, Andrew, Narberth, Pa. Booth 1232.
Knu-Vise, Inc., Detroit. Booth 2015.
Koch Sons, Inc., George, Evansville, Ind. Booth 2816.
Krieg Co., Charles W., Newark, N. J. Booth 1529.
Krouse Testing Machine Co., Columbus, Ohio. Booth 526.
Kuhlman Electric Co. (See Detroit Electric Furnace Division)
Kux Machine Co., Chicago. Booth 1209.
Laboratory Equipment Corp., Benton Harbor, Mich. Booth A-1807.
Lapeer Mfg. Co., Lapeer, Mich. Booth 2015. (See Knu-Vise, Inc.)
La Salle Steel Co., Chicago. Booth 2508.
Lead Industries Association, New York City. Booth 1602.
Leeds & Northrup Co., Philadelphia. Booth 1101.
Lepel High Frequency Laboratories, Inc., New York City. Booth 929.
Lester-Phoenix, Inc., Cleveland. Booth 1316.
L'Hommedieu & Sons Co., Chas. F., Chicago. Booth 250.
Light Metal Age, San Francisco. Booth 1901.
Lincoln Electric Co., Cleveland. Booth 734.
Lindberg Engineering Co., Chicago. Booth 726.
Lindberg Steel Treating Co., Chicago. Booth 1038.
Linde Air Products Co., New York City. Booths 838 and 840.
Liquid Carbonic Corp., Wall Chemicals Division, Chicago. Booth 2417.
Lithium Co., Newark, N. J. Booth 715.
Los Angeles Chamber of Commerce, Los Angeles. Booth 2016.
Machine and Tool Blue Book (Hitchcock Publishing Co.), Chicago. Booth 2723.
Machine Design (Penton Publishing Co.), Cleveland. Booth 209.
Machinery (Industrial Press), New York City. Booth 444.
Machinery & Welder Corp., St. Louis, Mo. Booth 1137.
Magnaflux Corp., Chicago. Booth 541.

Decorative and hard chromium plating; cemented tungsten carbide; stellite; tantalum and titanium carbide tools; and chromium-plated high speed steel tools. Plated molybdenum high speed steel, gear-shaper cutters show increased tool life.

8-112. Industrial Plating of Zinc-Base Die Castings. Charles Temple. *Metal Finishing*, v. 45, July 1947, p. 82-83.

Methods and equipment used by Globe Slicing Machine Co., Stanford, Conn.

8-113. Les Tendances Actuelles de la Technique des Dépots Electrolytiques. (Present Trends in the Technique of Electrolytic Deposits.) M. A. Glazunov. *Revue de Metallurgie*, v. 43, July-Aug. 1946, p. 214-218.

Desirable qualities in electrolytic deposits and methods of producing satisfactory ones.

8-114. Influence of Surface-Active Organic Compounds on the Kinetics of the Cathodic Deposition of Tin. M. Loshkarev, V. Sotnikova, and A. Krinkova. *Journal of Physical Chemistry (U.S.S.R.)*, v. 21, no. 2, 1947, p. 219-229. (In Russian.)

Influence of a series of additives on the kinetics of cathodic deposition of tin from sulphuric acid solution. The addition of slight amounts of alpha and beta-naphthols, xylenols, thymol, diphenylamine, or tribenzylamine results in polarization which increases with simultaneous addition of colloidal substances. 18 ref.

8-115. Inspection of Exposure Test Panels With Non-Decorative, Electrodeposited, Cathodic Coatings. H. A. Pray. *American Society for Testing Materials Preprint 39*, 1947, 4 p.

The function of cathodic, electrodeposited metallic coatings used for purely protective purposes and the way in which they deteriorate on weathering. Rating systems are summarized, with particular emphasis on the methods used for the exposure tests of electrodeposited lead coatings on steel.

8-116. Rating Exposure Test Panels of Decorative Electrodeposited Cathodic Coatings. W. A. Wesley. *American Society for Testing Materials Preprint 38*, 1947, 12 p.

Rating methods and a set of numerical reference standards developed for use in recent cooperative tests.

8-117. Roval Dichrome Process. *Engineering Materials*, v. 5, June 1947, p. 58.

New British process for surface treatment of zinc-base die castings prior to chromium plating. The use of this process eliminates the necessity for an intermediate metal layer.

8-118. Bright Copper Plating. *Canadian Metals & Metallurgical Industries*, v. 10, July 1947, p. 23.

Process developed by MacDermid Bros., Waterbury, Conn.

8-119. Procedures for High Volume Quality Plating. Jack Hasten. *Die Castings*, v. 5, Aug. 1947, p. 55-58.

Methods and equipment used in the plating of zinc-alloy die castings at C. M. Hall Lamp Co., Detroit, manufacturers of automotive lighting equipment.

8-120. New Pontiac Plating Plant. *Monthly Review*, v. 34, Aug. 1947, p. 956-958.

Describes and illustrates new General Motors plant.

8-121. Surface Texture Study of Electroplated Zinc. R. I. Lunt. *Metal Finishing*, v. 45, Aug. 1947, p. 68-70, 72.

A photomicrographic study of electroplated surface textures. The factors which influence surface texture and smoothness on strip and sheet steel. The work represents an investigation of zinc and zinc-alloy plating from acid baths.

8-122. Toxicity of Chemicals in Electroplating. P. M. Van Arsdell. *Metal Finishing*, v. 45, Aug. 1947, p. 55-60, 67.

Toxic reactions to the following metals and metallic salts: aluminum and its salts; ammonium hydroxide and ammonium salts; antimony and its salts; arsenic; boron compounds; cadmium and its salts; and chromium and compounds used in plating.

8-123. Corrosion Resistant Cements in the Plating Room. Vincent A. Curil. *Corrosion and Material Protection*, v. 4, July-Aug. 1947, p. 19-20.

The major problems of many plating rooms is the handling of corrosive solutions to prevent pitting and erosion of floors, destructive attack in drains and developments of leaks with resulting loss of solution from pickling and plating tanks. How they can be overcome and why they are important in electroplating operations.

8-124. World's Largest Plating Plant Eliminates All Manual Handling. Anders Jansson. *Tool Engineer*, v. 19, Aug. 1947, p. 29-30.

How automatic processing steps up production.

8-125. Chevrolet Increases Nickel Plating on Bumpers. Larry Strong and H. F. Reves. *Products Finishing*, v. 11, Aug. 1947, p. 20-22, 24, 26.

Equipment and procedures in electroplating department of forge, spring, and bumper division. Minimum thickness of plate is now triple that of recent specifications.

8-126. Electrometallurgy Devoted to the Electrodeposition of Metals. E. R. Thews. *Metal Industry*, v. 71, Aug. 1, 1947, p. 91-92.

The use of insoluble and cast anodes, the anode shape and characteristics, and the degree of solubility.

Section 8. For additional annotations indexed in other sections, see: 7-280-286-304-331; 18-158.

9 PHYSICAL TESTING

9-82. Osservazioni e Risultati Intorno Alla Prova di Compressione dei Materiali Metallici. (Observations and Results of Compression Tests on Metallic Materials.) G. Bonfiglioli. *Alluminio*, March-April 1947, p. 101-110.

A newly developed test apparatus intended specifically for compression tests on light metals. Methods of application of this apparatus and the data obtained for a series of light metals. Relationship between compression- and tensile-test results.

9-83. Testing Wrought Steel Wheels. Reid L. Kenyon. *Railway Mechanical Engineer*, v. 121, July 1947, p. 347-350, 353.

Special wheel testing machine developed by Armco engineers permits subjection of wheels to conditions even more severe than those encountered in service. Automatic control and recording instruments are included. Various cycles of brake application and cooling have been developed to reproduce thermal cracking and plate failure of wheels in a manner similar to rupture in service.

9-84. Machine Pour Essais de Forgeabilité des Aciers et Resultats d'Essais. (Machine for Testing the Forgeability of Steels and Test Results.) Robert Canard. *Revue de Metallurgie*, May-June 1946, p. 156-161.

The machine measures elongation as a function of temperature for different samples of steel and iron. The extent of the critical zone and its classification from the point of view of forgeability may be readily determined with this apparatus.

9-85. The Progress of Failure in Metals as Traced by Changes in Magnetic and Electrical Properties. P. E. Cavanagh. *American Society for Testing Materials Preprint 26*, 1947, 9 p.

Relative changes in magnetic and eddy-current losses during normal endurance tests in a rotating-beam machine for six metals at loads above and below the endurance limit. Endurance tests were run at various test speeds. 27 ref.

9-86. The Velocity Aspect of Tension-Impact Testing. William H. Hoppmann, II. *American Society for Testing Materials Preprint 32*, 1947, 12 p.

The guillotine impact testing machine of the Navy for studying the effect of moderately high velocities on the impact resistance of materials and minor structural elements. The method of Theodore von Kármán for dealing with the propagation of plastic deformations in solids, together with his concept of "critical velocity". Utilizing the von Kármán method, the critical velocity for a hard drawn copper has been calculated. 19 ref.

9-87. Etude de la Dispersion des Essais de Traction sur les Fontes Grises Pearlitiques. (Study of the Distribution of Tensile Test Values for Pearlitic Gray Irons.) Paul Bastien and Louis Beugras. *Comptes Rendus*, v. 224, May 12, 1947, p. 1330-1332.

Two types of test specimens were subjected to a series of tensile tests to determine the distribution of values. Grouping of the values is in accord with Gauss's law. These data characterize the pearlitic gray iron more precisely than shear and bending-test data.

9-88. Observations on Conducting and Evaluating Creep Tests. W. Siegfried. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 189-207.

Sustained-load tests on various heat resistant alloys used in the construction of gas turbines. Results evaluated in terms of the main problems presented by gas-turbine design. Problems of three-dimensional stressing at high temperatures and the influence of notches on hot strength. Results of sustained-load tests on smooth and notched bars at high temperatures. 16 ref.

9-89. Tensile Testing. *Iron and Steel*, v. 20, July 1947, p. 362.

Entirely new type of universal tensile and compression testing machine being sold by British firm.

9-90. End-Quenched Specimens. W. I. Pumphrey. *Iron and Steel*, v. 20, July 1947, p. 371-372.

Methods for polishing a flat along the length of the Jominy bar for hardness measurement after end quenching and a fixture for positioning the bar when taking hardness measurements along the flat.

9-91. A New Method of Measuring Wear of Machinery Surfaces. F. G. Brickwedde. *Instruments*, v. 20, July 1947, p. 620-622.

New technique in which length of a diamond-pyramid indentation in the surface decreases in proportion to the thickness of material removed.

9-92. Factors Affecting the Technical Hardness of Magnesium. Louis A. Carapella and William E. Shaw. *Light Metal Age*, v. 5, July 1947, p. 8-10.

Shortcomings of Brinell testing; standard conditions for hardness testing. 10 ref.

9-93. Basic Physical Tests for Steels. *Oil and Gas Journal*, v. 46, July 26, 1947, p. 291.

Descriptive.

9-94. Talks About Steelmaking. Harry Brearley. *British Steelmaker*, v. 13, July 1947, p. 338-340.

Tensile testing. Author believes that it will become obsolete.

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Magnesium Association, New York City. Booth 541.
Magnetic Analysis Corp., Long Island City, N. Y. Booth 1308.
Mall Tool Co., Chicago. Booth 1238.
Mallory & Co., Inc., P. R., Indianapolis, Ind. Booth 2701.
Manderscheid Co., Chicago. Booth 146.
Manhattan Rubber Division, Passaic, N. J. Booth 1215.
Martindale Electric Co., Cleveland. Booth 1516.
Materials and Methods (Reinhold Publishing Corp.), New York City. Booth 1337.
McGraw-Hill Publishing Co., Inc., New York City. (See *Welding Engineer*)
McKay Co., York, Pa. Booth 2636.
Metal & Thermit Corp., New York City. Booth 316.
Metal Finishing (Metal Industry Publishing Co.), New York City. Booth 2715.
Metal Finishing Service, Chicago. Booth 2530.
Metal Industries Catalog (Reinhold Publishing Corp.), New York City. Booth 1337.
Metal Industry Publishing Co., New York City. Booth 2715.
Metal Progres , Cleveland.
Metal-Working Equipment (Sutton Publishing Co., Inc.), New York City. Booth 2418.
Metallizing Co. of America, Chicago. Booth 2336.
Metals & Controls Corp., Attleboro, Mass. Booth 1817. (See Spencer Thermostat Co. and General Plate Division.)
Metals Review, Cleveland.
Michiana Products Corp., Michigan City, Ind. Booth 2720.
Mid-States Equipment Corp., Chicago. Booth 2536.
Midvale Co., Nicetown, Philadelphia. Booth 329.
Midwestern Sales, Inc., New York City. Booth 1905.
Milburn Co., Detroit. Booth 2717.
Miller Motor Co., Chicago. Booth 2740.
Milne & Co., A., Chicago. Booth 2106.
Mine Safety Appliances Co., Pittsburgh. Booth 1616.
Minneapolis-Honeywell Regulator Co. (See Brown Instrument Co.)
Miskella Infra-Red Co., Cleveland. Booth 2415.
Modern Metals, Chicago. Booth 2635.
Molybdenum Corp. of America, Pittsburgh. Booth 733.
Monarch Steel Co., Inc., Indianapolis, Ind. Booth 1150.
Mykroy, Inc. (See Scientific Electric Div.)
National Bearing Div., American Brake Shoe Co., St. Louis, Mo. Booth 342.
National Carbon Co., Inc., New York City. Booths 838 and 840.
National Cylinder Gas Co., Chicago. Booth 107.
National Engineering Co., Chicago. Booth 2307.
National Industrial Launderers and Cleaners Association, Cleveland. Booth 2524.
National Industrial Publishing Co., Pittsburgh. Booth 2829.

9-95. Determination of Knoop Hardness Numbers Independent of Load. L. P. Tarasov and N. W. Thibault. *Transactions of American Society for Metals*, v. 38, 1947, p. 331-348; discussion, p. 348-353.

A very precise Knoop hardness number independent of load can be computed for a given specimen from the lengths of indentations made at several different loads. A constant length correction found by trial and error results in essentially the same hardness number for each of the loads. This hardness number is given for molded boron carbide, a cemented carbide, a hardened toolsteel, and for single crystals of silicon carbide, aluminum oxide, topaz, and quartz.

9-96. Hardenability of Shallow Hardening Steels Determined by the P-V Test. B. F. Shepherd. *Transactions of American Society for Metals*, v. 38, 1947, p. 354-385; discussion, p. 385-397.

A new test specifically suited for steels which require cooling rates faster than 80° F. per sec. at 1300° F. for the microstructure to retain 50% martensite.

9-97. Changes in Microhardness of Metals in Relation to the Depth of Penetration of the Indenter and Condition of the Surface Layer. A. A. Bochvar and O. S. Zhadaeva. *Bulletin of the Academy of Sciences of the U.S.S.R. (Section of Technical Sciences)*, no. 3, 1947, p. 341-348. (In Russian.)

Microhardness tests on a series of nonferrous specimens cast on a polished plate so as to furnish a mirror surface. The tests were duplicated on the same specimens after polishing the original surface. In all instances, the hardness of the original mirror surface was lower than that of the polished surface. The workhardening characteristics of the polished surface were also different from that of the original surface.

9-98. Tests for Weld Metal; a Critical Estimate of Present Methods. H. Martin. *Welding*, v. 15, July 1947, p. 317-322.

Value of tests on weld-metal specimens and their relationship with the number of runs and the gage of electrode used. More efficient testing methods are suggested to replace those accepted at present.

9-99. A Comparison of Test Bar Designs Cast in 85-5-5-5 Alloys. L. W. Eastwood and J. G. Kura. *Foundry*, v. 75, Aug. 1947, p. 76-80, 226, 228, 230, 232, 234.

An extensive study of test-bar design to determine the correlation of test-bar properties with melt quality.

9-100. Structural Variations in Gas Turbine Alloys Revealed by the Stress-Rupture Test. Nicholas J. Grant. *Transactions of American Society for Metals*, v. 39, 1947, p. 335-359; discussion, p. 359-367.

In order to determine why occasional cast high-temperature, high-strength alloys of the Co-Cr-Mo-Ta system failed to produce consistent results, the effect of the mold preheat and metal-casting temperatures on rupture properties was studied in precision investment casting. A distinct relationship exists among the casting temperature of mold and metal, the structural variables of the alloy, and rupture and ductility properties.

9-101. The Effect of Composition and Structural Changes on the Rupture Properties of Certain Heat Resistant Alloys at 1500° F. Nicholas J. Grant. *Transactions of American Society for Metals*, v. 39, 1947, p. 368-402; discussion, p. 402-403.

Two low-carbon high-temperature, high-strength alloys, Vitallium and 6059, were prepared for rupture testing at 1500° F. by the precision hot-investment casting technique. Mold preheat temperature and metal pouring temperature were varied in the ranges 1500 to 2000° F. and 2600 to 2820° F., respectively. Correlations exist between casting variables and alloy structures. These structural variations in turn control the strength and ductility of the alloys.

9-102. Tensile Testing at Elevated Temperatures. A. W. Brunot. *Steel*, v. 121, Aug. 4, 1947, p. 90-91, 110, 112.

Comparatively new method for tests at 1500° F., using six furnaces. One operator can easily average 35 tests per shift.

9-103. Engineering Significance of Metals Testing. Blake D. Mills, Jr. *Iron Age*, v. 160, Aug. 7, 1947, p. 78-83.

Several important types of physical testing methods, including tension tests, compression tests, notched-bar tests, high-velocity tests, creep tests, and fatigue tests, with particular reference to their correlation with engineering practice. The use of statistical methods for checking material quality.

9-104. The Bend Test for Hardened High Speed Steel. Arthur H. Grobe and George A. Roberts. *American Society for Metals Preprint No. 22*, 1947. (To be published in *Transactions* for 1948.)

Three factors were investigated: specimen size; single and double-point loading; and number of specimens necessary to obtain reasonably accurate values of yield strength, bend strength, plastic deflection, and total deflection. The bend-test properties were determined for an 18-4-1 high speed steel quenched from six different temperatures. The effect of tempering on the bend-test properties over a wide range of tempering times and temperatures was studied for two high speed steels.

9-105. Yield Strength; Rapid Determination Without Using Stress-Strain Curves. L. J. Ebert, M. L. Fried, and A. R. Toole. *Metal Industry*, v. 71, July 25, 1947, p. 67-69.

A method for determining accurately the yield strength of nonferrous materials and heat treated steels with one operator and without an automatic load-elongation recorder. (A recent A.S.T.M. paper.)

9-106. Les Tendances Americaines dans les Essais d'Endurance. (American Trends in Endurance Testing.) H. W. Gillett, H. J. Grover, and L. R. Jackson. *Revue de Metallurgie*, v. 43, Sept-Oct. 1946, p. 268-270.

A review of the subject by American authors.

9-107. Difficultes dans l'Execution et l'Interpretation des Essais de Fatigue a la Flexion Rotative. (Difficulties in the Execution and Interpretation of Rotational Bending Fatigue Tests.) J. de. Lacombe. *Revue de Metallurgie*, v. 43, Sept-Oct. 1946, p. 271-284.

Numerous fatigue tests conforming to French aeronautic standards were performed on large test specimens. Difficulties in obtaining precise data include variable dispersion from one group of tests to another, heterogeneity of the steel, globular inclusions, and coatings of grease. 15 ref.

9-108. The Micro-Sclerometer. M. R. Girschig. *Industrial Diamond Review*, v. 7, July 1947, p. 208-211.

New microhardness tester for use in combination with inverted type microscopes for determining the diamond pyramid hardness of specimens of small dimensions (metal-foils, watch components) and of hard and brittle substances (glass, enamel, minerals). Construction of the instrument. (Translated and condensed from *Revue de Metallurgie*, v. 43, 1946, p. 95-112.)

9-109. Some Changes in Physical Properties of Steels and Wire Rope During Fatigue Failure. P. E. Cavanagh. *Canadian Institute of Mining and Metallurgy, Transactions* (Bound with *Canadian Mining and Metallurgical Bulletin.*) July 1947, p. 401-411.

Nondestructive testing to detect changes which occur in steel prior to fatigue failure; a magnetic test method for detecting early stages of failure. Changes in magnetic properties may indicate either increase or decrease in fatigue life, hence indication of continuous change over a considerable time is required in order to have a positive indication of the inception of fatigue failure.

Section 9. For additional annotations indexed in other sections, see: **3**-197-201-202-205-214-215-223-224-227-233-234-250-254-255; **4**-92; **11**-111-123-127-133; **18**-162-170-173-175; **20**-478; **21**-70; **22**-408-409-410; **24**-231-249-253; **27**-161.

10 ANALYSIS

10-121. Economic Method of Adapting Basic Spectrographic Equipment to Precision Quantitative Analysis. Philip H. Brotzman and Herman E. Hemker. *Steel*, v. 121, July 14, 1947, p. 83, 118, 121-122.

Methods developed by Parker Appliance Co. for inspection of forged and cast aluminum alloy aircraft parts.

10-122. Spectrographic Analysis of Stainless Steels. D. P. Jensen. *Iron Age*, v. 160, July 17, 1947, p. 47-48.

Improved method developed by Douglas Aircraft Co. is unique in its use of an internal standard which is not the matrix element iron but the sum total of all the metallic constituents of the specimen.

10-123. Colorimetric Determination of Small Amounts of Aluminum in Steel. N. K. Kuskova. *Journal of Analytical Chemistry (U.S.S.R.)*, v. 2, no. 1, 1947, p. 7-16. (In Russian.)

Method permits determination of 0.005 to 0.15% Al in steel. Advantages over other colorimetric methods. 31 ref.

10-124. The Use of Diphenylthiocarbazone (Dithizone) in Analysis. Part II. Dissociation Constants of Zinc, Cadmium, and Lead Dithizonates. A. K. Babko and A. T. Pilipenko. *Journal of Analytical Chemistry (U.S.S.R.)*, v. 2, no. 1, 1947, p. 33-42. (In Russian.)

Results of a study of the composition of the above compounds in CCl_4 solution, equilibria between the dithizonates and the metal salts at different pH and concentration values, and equilibria between the dithizonates and H_2S. Relationships between the dithizonates, sulphides, and the ammoniates of the respective metals.

10-125. Polarographic Determination of Zinc in Metallic Cadmium by Means of a Preliminary Separation of Cadmium Using Electrolysis and an Aluminum Cathode. P. N. Kovalenko and V. L. Dmitrieva. *Journal of Analytical Chemistry (U.S.S.R.)*, v. 2, no. 2, 1947, p. 85-92. (In Russian.)

10-126. A Colorimetric Method for the Estimation of Small Amounts of Aluminum in Beryllium Salts. R. V. Mervel. *Journal of Analytical Chemistry (U.S.S.R.)*, v. 2, no 2, 1947, p. 103-110. (In Russian.)

Method described permits estimation of 0.002 to 0.5% Al by formation of the oxyquinolate. Time of determination is 1 to 1½ hr. 10 ref.

10-127. Separation of Cerium From the Rare Earth Metals by the Bromate-Pyridine Method. E. A. Ostroumov. *Journal of Analytical Chemistry (U.S.-*

(Turn to page 32)

National Research Corp., Cambridge, Mass. Booth 2018.
National Time & Signal Corp., Detroit. Booth 2435.
Nelson Sales Corp., Lorain, Ohio. Booth 322.
New Equipment Digest (Penton Publishing Co.), Cleveland. Booth 209.
New Jersey Zinc Co., New York City. Booth 1706.
Newcomb Engineering Co., Grand Rapids, Mich. Booth 1426.
New York Grinding Wheel Corp., Brooklyn, N. Y. Booth 1803.
North American Philips Co., Inc., New York City. Booth 145.
Ohio Carbon Co., Cleveland. Booth 2430.
Ohio Crankshaft Co., Cleveland. Booth 644.
Ohio Seamless Tube Co., Shelby, Ohio. Booth 1321.
Ohio Steel Foundry Co., Cincinnati, Ohio. Booth 151.
Olsen Testing Machine Co., Tinius, Philadelphia. Booth 345.
Organic Finishing (Metal Industry Publishing Co.), New York City. Booth 2715.
Osborn Mfg. Co., Cleveland. Booth 2407.
Packer Machine Co., Meriden, Conn. Booth 1928.
Page Steel and Wire Division, American Chain & Cable Co., Bridgeport, Conn. Booth 1219.
Pako Corp., Minneapolis. Booth 1132.
Pangborn Corp., Hagerstown, Md. Booth 409.
Park Chemical Co., Detroit. Booth 634.
Parker-Kalon Corp., New York City. Booth 2404.
Partlow Corp., New York City. Booth 714.
Penton Publishing Co., Cleveland. Booth 209.
Permanente Products Co., Oakland, Calif. Booth 304.
Peters-Dalton, Inc., Detroit. Booth 1828.
Peterson Welding Laboratories, Kansas City, Mo. Booth 1818.
Phillips Mfg. Co., Chicago. Booth 1322.
Picker X-Ray Corp., New York City. Booth 426.
Pines Engineering Co., Inc., Aurora, Ill. Booth 306.
Porter-Cable Machine Co., Syracuse, N. Y. Booth 1325.
Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass. Booth 1717.
Powder Weld Process Co., Brooklyn, N. Y. Booth 1630.
Precision Scientific Co., Chicago. Booth 315.
Precision Welder & Machine Co., Cincinnati, Ohio. Booth 1137.
Progressive Welder Co., Detroit. Booth 1242.
Pyrometer Instrument Co., New York City. Booth 422.
RCA Victor Div., Radio Corp. of America, Camden, N. J. Booth 2714.
Rack Engineering Co., Pittsburgh. Booth 2802.
Ransohoff, Inc., N., Cincinnati, Ohio. Booth 1020.
Ransome Machinery Co., Dunellen, N. J. Booth 130.
Rapids-Standard Co., Inc., Grand Rapids, Mich. Booth 947.
Raybestos-Manhattan, Inc. (See Manhattan Rubber Div.)
Reinhold Publishing Corp., New York City. Booth 1337.
Revere Copper & Brass, Inc., New York City. Booth 1050.
Revista Industrial (Penton Publishing Co.), Cleveland. Booth 209.
Reynolds Metals Co., Louisville, Ky. Booth 323.
Richards Co., J. A., Kalamazoo, Mich. Booth A-1811.
Riehle Testing Machines Division, American Machine & Metals, Inc., East Moline, Ill. Booth 1326.
Roebling's Sons Co., John A., Trenton, N. J. Booth 1342.
Rogers & Co., G. S., Chicago. Booth 1514.
Ryerson & Son, Inc., Joseph T., Chicago. Booth 917.
Salkover Metal Processing, Chicago. Booth 126.
Sargent & Co., E. H., Chicago. Booth 1722.
Schrader's Son, A., Div. of Scovill Mfg. Co., Inc., Brooklyn, N. Y. Booth 2335.
Sciaky Brothers, Inc., Chicago. Booth 1254.
Scientific Electric Division, "S" Corrugated Quenched Gap Co., Chicago. Booth 518.
Scott & Son, Inc., C. U., Rock Island, Ill. Booth 911.
Scovill Mfg. Co., Waterbury, Conn. Booths 532 and 2335.

S.R.), v. 2, no. 2, 1947, p. 111-117. (In Russian.)

Formation of tetravalent cerium in the form of the basic bromate. Conditions for quantitative separation by means of pH regulation using a mixture of pyridine-HCl salts. The method is claimed to be applicable in analytical chemistry and also in obtaining pure cerium compounds. 15 ref.

10-128. Behavior of Rhodium During Polarographic Analysis. S. A. Repin. *Journal of Applied Chemistry (U.S.S.R.)*, v. 20, no. 1 and 2, 1947, p. 46-54. (In Russian.)

A series of complex compounds of rhodium were investigated to determine the possibility of polarographic determination of the metal.

10-129. Determination of Rhodium in the Presence of Iridium and Platinum by Means of a Polarographic Method. S. A. Repin. *Journal of Applied Chemistry (U.S.S.R.)*, v. 20, no. 1 and 2, 1947, p. 55-62. (In Russian.)

Method permits determination with an error of not more than 2 to 3% of the amount present, 0.001 g. in one liter of solution being easily determined. Time of determination is approximately 1 hr. 7 ref.

10-130. Copper in Aluminum Alloys. L. E. Vvedenski. *Metal Industry*, v. 71, July 4, 1947, p. 9.

Certain improvements in the spectrographic technique which are claimed to result in greatly improved accuracy. (Condensed from *Zavodskaya Laboratoriya.*)

10-131. Use of the Spectroscope in the Determination of the Constituents of Boiler Scale and Related Compounds. Alton Gabriel, Howard W. Jaffe, and Maurice J. Peterson. *American Society for Testing Materials Preprint 116*, 1947, 6 p.

10-132. Determination of Lead in Presence of Barium, Strontium, Calcium and Magnesium. Part III. V. P. Shvedov. *Journal of General Chemistry (U.S.S.R.)*, v. 17, no. 1, 1947, p. 33-38. (In Russian.)

Formation of the oxy-chloride, followed by its solution in ammonium acetate, and subsequent precipitation as lead chromate.

10-133. Report on Standard Samples for Spectrochemical Analysis. *American Society for Testing Materials, Technical Publication No. 41-B*, 1947, 23 p.

Standard samples for iron and steel; aluminum and its alloys; magnesium and its alloys; zinc, lead, tin, and copper alloys; and miscellaneous material available from the U. S. Bureau of Standards and various companies.

10-134. Spot-Etching Apparatus for Light Metals. Ulsamer, Egler and Trocke. *Headquarters Air Materiel Command, Wright Field, Translation F-TS-1863-RE*, May 1947, 2 p.

Simplified apparatus for identification of various light metals. Its use on a number of samples. (From *BMW Flugmotorenbau G.m.b.H.*, Aug. 1943.)

10-135. En Undersokning av Fotografiska Platar fur Spektralanalys. (Investigation of Photographic Plates for Spectrochemical Analysis.) Per Spiegelberg. *Jernkontorets Annaler*, v. 131, no. 5, 1947, p. 181-191.

A series of photographic plates of different brands were investigated to determine the contrast and deviation from average density due to the grain. A formula is proposed for computation of these values. Density fluctuations due to grain are independent of the wave length.

10-136. Bestamning av Kisel och Kiselsyra med Gelatin-Metoden. (Determination of Silicon and Silica by the Gelatine Method.) Erik Hammarberg. *Jernkontorets Annaler*, v. 131, no. 6, 1947, p. 199-211.

The gelatine method—precipitation of silica in an acid solution by the addition of gelatine—for the determination of silicon in pig iron, steel and some ferro-alloys, as well as silica in silicates, gives as correct results as dehydration methods. Time required for the gelatine method is much shorter than for the older dehydration method.

10-137. Spectrochemical Determination of Lithium, Sodium, and Iron in Lithium-Bearing Ores. George Oplinger. *Analytical Chemistry*, v. 19, July 1947, p. 444-447.

A quantitative method with a precision of ± 1 to 2% for the lithium oxide determination. 15 ref.

10-138. Use of Convection Effects in Gas Analysis by Thermal Conductivity. Clarke C. Minter. *Analytical Chemistry*, v. 19, July 1947, p. 464-465.

Analyzing a ternary mixture of gases by comparing its thermal conductivity with that of a binary mixture of known composition and then comparing the effect of pressure on convection for the two mixtures. While the mixtures investigated consisted only of H_2, CO_2 and CH_4, the method should be applicable to other combinations of gases that do not react chemically with each other.

10-139. Device for Estimating the Height of Polarographic Waves. John Keenan Taylor. *Analytical Chemistry*, v. 19, July 1947, p. 478-480.

Simple device can be used for measuring diffusion currents by either graphical or exact methods.

10-140. Unitized Mercury Cathode Apparatus for Electrolytic Removal of Metals. Hilton O. Johnson, J. R. Weaver, and Louis Lykken. *Analytical Chemistry*, v. 19, July 1947, p. 481-483.

Apparatus consists of a self-contained immersion electrode assembly coupled to a high-capacity Tungar rectifier and a suitable control panel. It removes approximately 0.5-gram quantities of copper, iron, nickel, cobalt, chromium, zinc, and many other elements in one hour or less from an acidic solution. It also removes interfering elements prior to polarographic analysis for aluminum, sodium, potassium, and other metals not removed by electrolysis with a mercury cathode. 12 ref.

10-141. Colorimetric Determination of Cobalt Using Nitroso-R Salt. Hobart H. Willard and Samuel Kaufman. *Analytical Chemistry*, v. 19, July 1947, p. 505.

Experiments indicate superiority of a blue-filter for this determination.

10-142. Spectrochemical Determination of the Major Constituents of Minerals and Rocks. Aslak Kvalheim. *Journal of the Optical Society of America*, v. 37, July 1947, p. 585-592.

A method using the a.c. carbon arc is described for the spectrochemical determination of Si, Na, K, Al, Ca, Mg, Fe, and Mn in minerals, rocks, slags, and related substances. The determination of Ti is also discussed.

10-143. Spectrographic Analysis of Zinc and Lead. J. Morris. *Canadian Chemistry and Process Industries*, v. 31, July 1947, p. 665-666, 669-670.

Methods used at Consolidated Mining and Smelting Company, Ltd., Trail, B. C.

10-144. Proximate Analysis of Furnace Gases. G. A. Burgvits and G. S. Iakovlev. *Boiler and Turbine Construction (U.S.S.R.)*, Feb. 1947, p. 32. (In Russian.)

Use of a platinum catalyst at 450° and equations for calculation of the heat content of hydrocarbon mixtures from the analytical data.

10-145. Separation du Nickel et du Cobalt dans le Microdosage du Cuivre par le di-Ethyl-di-thiocarbamate. (Separation of Nickel and Cobalt in the Microdetermination of Copper by Diethyldithiocarbamate.) H. Cheftelo, J. Bail, R. Fouasson and P. Clavie. *Bulletin de la Société Chimique de France*, March-April 1947, p. 311-313.

Nickel is eliminated by chloroform extraction of the water-insoluble compound formed in the reaction with dimethylglyoxime. With the same reagent cobalt gives a water-soluble complex which removes that element by the carbamate reaction. Quantities of copper of the order of 0.025 mg. may be determined within 0.001 mg. in samples of several mg. to 1 kg.

10-146. Emploi du Stannochlorure de Potassium Dihydraté dans le Dosage Volumétrique du Vanadium et du Molybdène. (Use of Dehydrated Potassium Chlorostannate in Volumetric Determination of Vanadium and Molybdenum.) Tryphon Karantassis and Catherine Stathi. *Comptes Rendus*, v. 224, June 2, 1947, p. 1564-1566.

Data support the claim that the method is far more accurate than those previously described.

10-147. A New Method of Spectrographic Analysis. R. Ricard and A. Cornu. *Engineers' Digest (American Edition)*, v. 4, July 1947, p. 311-312.

In order to directly compare lines of unknown concentration in a sample with similar lines of a calibrated standard sample, the normal spectrograph slit has been replaced by a reflecting cylinder of small diameter. When illuminated, the virtual focus of the cylinder supplies a ray which can be used without a slit. The light source can then be arranged outside the collimator axis and one can then utilize two light sources at the same time. The spectra of a standard and of an unknown sample can therefore be projected onto the same part of a photographic plate. (Translated and condensed from *Revue de Metallurgie*, v. 42, Dec. 1945, p. 389-392.)

10-148. The Economic Significance of Direct Reading Spectrochemical Analysis. M. F. Hasler. *Iron Age*, v. 160, Aug. 14, 1947, p. 71-73.

Various metal producing capacity classifications are considered from the standpoint of savings in operating costs and laboratory costs, since advantages of high speed analysis are related, to some degree, to plant size. The high degree of composition control results in substantial reductions in scrap losses.

10-149. Polarographic Determination of Zinc in Aluminum Alloys. W. Stross. *Metallurgia*, v. 36, July 1947, p. 163-166.

An improved modification of a method previously published. An alternative technique is based on the same principle, but does not require the use of a centrifuge. It includes a modification on the semi-micro to micro scale. Routine method of determining zinc in aluminum alloys. (To be continued.)

Section 10. For additional annotations indexed in other sections, see: 11-113-127; 18-172; 27-157-164.

11 INSTRUMENTS Laboratory Apparatus

11-101. Metallographic Identification of Sigma Phase in 25-20 Austenitic Alloy. G. N. Emmanuel. *Metal Progress*, v. 52, July 1947, p. 78-79.

The effect of various etching reagents and techniques on the appearance of sigma phase under the microscope on heating 1000 hr. at 1600° F.

11-102. Source of Polishing Scratches. David J. Mack. *Metal Progress*, v. 52, July 1947, p. 105-106.

Precautions to be followed to prevent abrasion in metallographic work.

11-103. The Automatic Sonigage. Wesley S. Erwin and Gerald M. Rassweiler. *Iron Age*, v. 160, July 24, 1947, p. 48-55.

Simple ultrasonic device that makes possible rapid nondestructive tests of

(Turn to page 34)

Selas Corp. of America, Philadelphia. Booth 818.
Sellers Engineering Co., Chicago. Booth 614.
Sentry Co., Foxboro, Mass. Booth 543.
Shakeproof, Inc., Chicago. Booth 2502.
Shell Oil Co., Inc., New York City. Booth 1716.
Simonds Saw & Steel Co., Fitchburg, Mass. Booth 2223.
Smith Corp., A. O., Milwaukee. Booth 1702.
Socony-Vacuum Oil Co., Inc., New York City. Booth 1518.
Solventol Chemical Products, Inc., Detroit. Booth 448.
South Bend Lathe Works, South Bend, Ind. Booth 1025.
Specialty Equipment & Machinery Corp., New York City. Booth 206.
Spencer Thermostat Co., Attleboro, Mass. Booth 1817.
Spencer Turbine Co., Hartford, Conn. Booth 854.
Sperry Products, Inc., Hoboken, N. J. Booth 2308.
Standard Electrical Tool Co., Cincinnati, Ohio. Booth 1914.
Standard Plating Rack Co., Chicago. Booth A-1821.
Steel (Penton Publishing Co.), Cleveland. Booth 209.
Steel-Parts Mfg. Co., Chicago. Booth 2318.
Stevens Co., Charles G., Chicago. Booth 1332.
Stoody Co., Whittier, Calif. Booth 829.
Strand & Co., N. A., Chicago. Booth 2323.
Stuart Oil Co., D. A., Chicago. Booth 416.
Stutson Associates, Willis, Chicago. Booth A-1817.
Sunbeam Corp., Sunbeam-Stewart Industrial Furnace Division, Chicago. Booth 916.
Superior Tube Co., Norristown, Pa. Booth 1805.
Surface Combustion Corp., Toledo, Ohio. Booth 617.
Sutton Publishing Co., Inc., New York City. Booth 2418.
Taco-West Corp., Chicago. Booth 1234.
Tempil Corp., New York City. Booth 1622.
Tennant Co., G. H., Minneapolis. Booth 2116.
Texas Co., Chicago. Booth 2215.
Tide Water Associated Oil Co., New York City. Booth 2535.
Tincher Products Co., Chicago. Booth 1922.
Tinnerman Products, Inc., Cleveland. Booth 210.
Titanium Alloy Mfg. Co., New York City. Booth 2607.
Torit Mfg. Co., St. Paul, Minn. Booth 2316.
Towmotor Corp., Cleveland. Booth 2030.
Trent Tube Mfg. Co., East Troy, Wis. Booth 1621.
Tri-Arc Corp., Chicago. Booth 1721.
Udylite Corp., Detroit. Booth 350.
Union Carbide & Carbon Co. (See Linde Air Products Co.; Haynes Stellite Co., National Carbon Co.)
U. S. Reduction Co., East Chicago, Ind. Booth 242.
Universal-Cyclops Steel Corp., Bridgeville, Pa. Booth 430.
Upton Electric Furnace Div., Detroit. Booth 536.
Vacu-Blast Co., Inc., San Mateo, Calif. Booth 2235.
Vacuum Engineering Div. (See National Research Corp.)
Vanadium-Alloys Steel Co., Latrobe, Pa. Booth 309.
Vanadium Corp. of America, New York City. Booth 420.
Vapor Blast Mfg. Co., Milwaukee. Booth A-1814.
Vascoloy-Ramet Corp., North Chicago, Ill. Booth 2115.
Wall Chemicals Division, Liquid Carbonic Corp., Chicago. Booth 2417.
War Assets Administration, Washington, D. C. Booth 1249.
Welding Engineer, New York City. Booth 1715.
Wells, Inc., Martin, Los Angeles. Booth 2824.
Wells Mfg. Corp., Three Rivers, Mich. Booth 2204.
Weltronic Co., Detroit. Booth 2915.
Western Metals. Booth 1918.
Westinghouse Electric Corp., Pittsburgh. Booth 253.
Wheelco Instruments Co., Chicago. Booth 515.
Whistler & Sons, Inc., S. B., Buffalo, N. Y. Booth 301.
Wilson Mechanical Instrument Co., Inc., New York City. Booth 938.
Yale & Towne Mfg. Co., Philadelphia. Booth 116.
Yoder Co., Cleveland. Booth 1241.

many metal and plastic parts. Only one surface need be available to measure thickness, with less than 2% error. Thickness of tubes, as well as flat parts, between 0.005 and 0.250 in., may be read directly, and up to several inches, may be read indirectly. Solid parts may be inspected for flaws.

11-104. Une Méthode Electrolytique Rapide de Determination des Inclusions de Silice dans l'Acier. (Rapid Electrolytic Method of Determination of Silica Inclusions in Steel.) Adam Skapski, Adam Bielanski, and Marek Sobieski. *Revue de Metallurgie*, v. 43, July-Aug. 1946, p. 229-233.

A newly developed method for determining silica inclusions, consisting of a combination of electrolytic and analytical methods. The time for determination is about 3 hr. In comparison with the bromine method, the new one is considered excellent.

11-105. Les Principales Maladies De La Malleable A Coeur Noir Et Leur Diagnostic Micrographique. (The Principal Defects in Black-Heart Malleable Iron and Their Micrographic Diagnosis.) Henri Laplanche. *Fonderie*, no. 14, Feb. 1947, p. 507-526.

A method for rapid determination of anomalies arising during the process of graphitization and methods for overcoming the difficulties. 13 ref.

11-106. Measures Contours of Surfaces. F. R. Nitchie, Jr. *Machine Design*, v. 19, July 1947, p. 136.

Mechanical instrument developed to measure the dimensions of marine propellers to tolerances much smaller than those generally accepted. This instrument should prove useful for any application requiring the measurement of radial or concentric cylindrical contours or sections, particularly of irregular surfaces.

11-107. The Determination of Pipe Protection by the Continuous Polarity Method. Wm. E. Huddleston. *Corrosion*, v. 3, July 1947, p. 325-330; discussion, p. 330.

Technique illustrated by three examples. Procedure used in making repairs in wrapped pipe coating.

11-108. Instrument Development in Research. *Aircraft Production*, v. 9, July 1947, p. 252-255.

Measurement by electrical and electronic methods in the Napier aircraft-engine laboratories. New instruments devised include a device for remote measurement of small movements without loading the part under investigation, an aeration meter, a detonation indicator, and an engine-testing set and its calibration.

11-109. Technique of X-Ray Powder Photography. H. P. Rooksby. *Nature*, v. 160, July 5, 1947, p. 7-9.

Descriptive. 11 ref.

11-110. Report of Committee A-6 on Magnetic Properties. *American Society for Testing Materials Preprint 5*, 1947, 8 p.

Proposed tentative methods for permeability of paramagnetic materials, and tentative specifications for flat-rolled electrical steel.

11-111. Report of Committee B-4 on Electrical Heating, Resistance, and Related Alloys. *American Society for Testing Materials Preprint 11*, 1947, 12 p.

Proposed tentative method for measuring residual stress in cylindrical metal-to-glass seals and proposed tentative methods of testing fine round and flat wire for electronic devices.

11-112. A New Differential Manometer. A. Lerner and A. Makasov. *Industrial Power (U.S.S.R.)*, v. 4, no. 2, 1947, p. 11-12. (In Russian.)

Recording manometer for furnaces indicates pressure differences as small as 0.1 mm. H_2O.

11-113. Radiographie Electronique de Minerals. (Electronic X-Ray Investigation of Minerals.) Charles Legrand and Jean-Jacques Trillat. *Comptes Rendus*, v. 224, March 31, 1947, p. 1000-1001.

A new method of X-ray investigation by reflection (using the secondary electrons given off under the effect of penetrating X-rays) may be applied in the determination of the composition of minerals.

11-114. Methodiek en Resultaten van het Electronen-Microscopisch Onderzoek van Metalen. (Methods and Results of Electronic Microscopic Investigation of Metal Surfaces.) D. L. Ingelse. *Metalen*, v. 1, May 1947, p. 155-157.

A method by which suitable replicas for electron-microscope observation of etched metal surfaces are prepared. Results for heat treated steel and aluminum compared with those obtained with ordinary microscopic observations.

11-115. Electric Positioning Systems of High Accuracy for Industrial Use. D. E. Garr. *General Electric Review*, v. 50, July 1947, p. 17-24.

The components of such systems in chemical plants and steel mills.

11-116. Tracer Micrography Developed. *Chemical and Engineering News*, v. 25, July 21, 1947, p. 2073.

Method for studying the concentration of radioactive isotopes.

11-117. Methodiek En Resultaten Van Het Electronen-Microscopisch Onderzoek Van Metalen. (Methods and Results Obtained in Electron Microscope Study of Metals.) (Continued.) L. Ingelse. *Metalen*, June 1947, p. 181-188.

Illustrated by numerous photomicrographs. (To be continued.)

11-118. Primaretsning av Svetsgods. (Primary Etching of Welds.) Erik Magnusson. *Jernkontorets Annaler*, v. 131, no. 6, 1947, p. 212-224.

Recommendations for reagents and procedures, and for preliminary quenching and tempering to produce a finer microstructure. The mechanism of etching.

11-119. Examen Micrographique de Textures Orientees sur Aluminium Lamine. (Micrographic Examination of the Textures of Sheet Aluminum.) J. Herenguel and F. Santini. *Metaux et Corrosion*, v. 21, Oct-Nov. 1946, p. 131-136.

An electropolishing process in use for aluminum of industrial purity and a selective method of attack which reveals the grain boundaries. This method was used to study sheet iron made from ingots having a highly developed basaltic texture.

11-120. Application du Monochromateur a Lame Courbe a l'Identification et au Dosage des Phases dans les Alliages Metalliques. (Application of the Monochromator for Curved Specimens to the Identification and Determination of Phases in Metallic Alloys.) Rene Faivre. *Metaux et Corrosion*, v. 21, Feb. 1947, p. 21-27.

New monochromator for the study of curved specimens of complex metal alloys.

11-121. Two Calculating Machines for X-Ray Crystal Structure Analysis. A. D. Booth. *Journal of Applied Physics*, v. 18, July 1947, p. 664-666.

Two mechanisms have proved of great service in several analyses. The simpler of the devices is of general application and can be constructed with comparatively limited workshop facilities.

11-122. An Electronic Computer for X-Ray Crystal Structure Analyses. R. Pepinsky. *Journal of Applied Physics*, v. 18, July 1947, p. 601-604.

The instrument sums the two-dimensional Fourier series representing planar, centro-symmetric projections of electron densities in a crystal unit cell. Projection is by a television scan on the screen of a cathode-ray oscilloscope. The specific advantage of the device is the immediate observability of effects on the projection of alterations in signs of one or any number of Fourier coefficients.

11-123. New Accuracy Attained in Gaging Metal Wear. *Aviation Week*, v. 47, Aug. 4, 1947, p. 21-22.

New diamond indentation method developed at National Bureau of Standards.

11-124. Precision Measurement. Section II. Instrument Inspection. Part 13. Measurement of Threads and Gears. Warren Baker. *Machine and Tool Blue Book*, v. 43, Aug. 1947, p. 207-210, 212-218, 220, 222, 224.

Standard designations of threads; glossary; measurement methods; formulas; measuring external, internal and helical gears.

11-125. A Carburizing Experiment With Radioactive Carbon. J. K. Stanley. *Metal Progress*, v. 52, Aug. 1947, p. 227-229.

How radioactive carbon was introduced into iron by means of radioactive $BaCO_3$, which contains the C^{14} isotope. Using this material as a carburizer enables a test to be made of current theories about the mechanism of carburization and the action of so-called energizers.

11-126. New Metallurgical Techniques and New Alloys of Magnesium. J. C. McDonald. *Metal Progress*, v. 52, Aug. 1947, p. 243-248.

Concluding part of a paper read before Western Metal Congress. Improved etchants that develop grain size and distinguish between tiny casting voids and microporosity, and also can correlate composition, ultra-fine structure, and corrosion behavior. New alloys with zirconium and cerium.

11-127. Bits and Pieces. *Metal Progress*, v. 52, Aug. 1947, p. 248-250.

Projector for microscope images used, by Arthur R. Watson. Making an expansion fit, by Avery C. Jones. Testing hardness up to 700° F., by A. L. Pranses. Mount identification tool, by O. L. Noftsinger, and Distinguishing the Be-Cu alloys, by Frank C. Bennett, Jr.

11-128. Metallography of Hot Dipped Galvanized Coatings. D. H. Rowland. *American Society for Metals Preprint No. 18*, 1947. (To be published in *Transactions* for 1948.)

A new metallographic etching reagent for galvanized coatings demonstrates that the alloy layer of galvanized coatings contains all of the phases shown by the Schramm iron-zinc constitution diagram at the temperature level of commercial coating practice. Thickness measurements and microhardness values of the various phases.

11-129. Multiple Correlation Applied to Steel Plant Problems. W. T. Rogers. *American Society for Metals Preprint No. 27*, 1947, 16 p. (To be published in *Transactions* for 1948.)

The application of multiple correlation methods to four different types of problems encountered in a large steel plant. Its purpose is to show the versatility of this type of analysis and to point out the practical results which have been obtained by its use.

11-130. Detection of As-Cast Austenite Grain Size in Heat Treated Cast Alloy Steels. Edward A. Loria. *American Society for Metals Preprint No. 28*, 1947, 15 p. (To be published in *Transactions* for 1948.)

A method for measuring the as-cast austenite grain size in cast alloy steels by considering the effects of solidification pattern and segregation of alloying elements on the development of the as-cast grain pattern.

11-131. Relative Thickness of Lead, Concrete, and Steel Required for Protection Against Narrow Beams of X-Rays. George Singer, Harold O. Wyckoff, and Frank H. Day. *Journal of Research of the National Bureau of Standards*, v. 38, June 1947, p. 665-672.

(Turn to page 36)

Product Guide to Metal Exposition

A classified list of exhibitors in the 29th National Metal Exposition to be held in Chicago, Oct. 18 through 24. Exhibits are classified under 11 general headings, with brief descriptions of specific products being displayed.

Metals

Allegheny Ludlum Steel Corp. Booth 216. Toolsteel, stainless, electrical and special steels.

Alloy Casting Co. Booth 246. Stainless castings.

Aluminum Co. of America. Booth 630. Aluminum in raw and fabricated forms.

American Brake Shoe Co. Booth 342. ABK metal and Meehanite; brass and bronze castings; manganese steel castings; heat and corrosion resistant alloys.

American Brass Co. Booth 939. Copper and copper alloys; Everdur metal.

American Smelting & Refining Corp. Booth 1041. (See Federated Metals Division)

Ampco Metal, Inc. Booth 110. Ampco metal; aluminum bronze; beryllium copper; other copper alloys.

Braeburn Alloy Steel Corp. Booth 1032. Tool and specialty steels.

Bridgeport Brass Co. Booth 1251. Brass and copper mill products; high-strength silicon bronze and aluminum bronze.

Carboloy Co., Inc. Booth 1142. Cemented carbide; wear resistant parts.

Climax Molybdenum Co. Booth 2102. Reception space only.

Columbia Tool Steel Co. Booth 1119. High speed and toolsteels.

Crucible Steel Corp. of America. Booth 1131. High speed, tool, stainless, alloy, machinery and special steels.

Division Lead Co. Booth A-2635. Babbitts; solders; lead and tin products.

Fansteel Metallurgical Corp. Booth 2115. Rare metals and alloys; tantalum-tungsten carbides.

Federated Metals Division, American Smelting & Refining Co. Booth 1041. Aluminum, brass and bronze ingot; bearing alloys; solder; die-casting alloys; zinc dust.

Frontier Bronze Corp. Booth 1115. Aluminum and other alloy castings and shapes and sheets.

General Plate Division, Metals & Controls Corp. Booth 1817. Laminated precious metals; thermostatic metal.

Greenlee Foundry Co. Booth 2830. Gray iron and Meehanite castings.

Handy & Harman. Booth 150. Silver brazing alloys.

Hardy, Inc., Charles. Booth 1618. Metal powders and alloy powders.

Haynes Stellite Co. Booths 838 and 840. High-temperature and stainless alloys; hard facing materials; Hastelloy nickel-base and Multimet alloys.

International Nickel Co., Inc. Booth 637. Nickel, monel, Inconel; stainless steels; nickel steels and irons; other nickel alloys.

Janney Cylinder Co. Booth 154. Bronze, monel, iron, alloy and stainless steel centrifugal castings.

Jones & Laughlin Steel Corp. Booth 442. Plain and alloy steel; cold finished steel.

Joslyn Mfg. & Supply Co. Booth 236. Stainless steels.

Kennametal, Inc. Booth 2613. Cemented carbides; wear resistant parts.

La Salle Steel Co. Booth 2508. Stressproof steels; cold finished steels.

Lead Industries Association. Booth 1602. Lead and lead alloys.

Magnesium Association. Booth 541. Magnesium alloys and products.

Mallory & Co., Inc., P. R. Booth 2701. Elkonite for resistance welding and electrical contacts.

Midvale Co. Booth 329. Special steel products.

Milne & Co., A. Booth 2106. Toolsteels; Stressproof steel; iron.

Molybdenum Corp. of America. Booth 733. Alloys, chemicals and powders of tungsten, molybdenum and boron.

Monarch Steel Co., Inc. Booth 1150. Cold-finished steel; Speed Case and Speed Treat.

National Research Corp. Booth 2013. High-purity vacuum melted metals.

Permanente Products Co. Booth 334. Kaiser aluminum products.

Powder Weld Process Co. Booth 1030. Fragmented metals.

Revere Copper & Brass, Inc. Booth 1050. Copper, brass, magnesium and aluminum.

Reynolds Metals Co. Booth 328. Aluminum primary products and end products.

Ryerson & Son, Inc., Joseph T. Booth 917. Stainless steels; alloy steels; free-machining steels; Nitralloy.

Scovill Mfg. Co. Booth 532. Cartridge brass; representative brass mill products.

Stevens Co., Charles G. Booth 1338. Steel and wire of various types; nonferrous wire.

Titanium Alloy Mfg. Co. Booth 2607. Titanium alloys; zirconium; titanium stainless steels; titanium enameling steel.

Universal-Cyclops Steel Corp. Booth 430. Tool and special steels.

U. S. Reduction Co. Booth 242. Aluminum alloy ingots and aluminum fluxes.

Vanadium-Alloys Steel Co. Booth 300. High speed, carbon and alloy toolsteels free from segregation.

Vanadium Corp. of America. Booth 420. Ferro-alloys.

Last Call for

Metallographic Exhibit

Send entries immediately to Metallographic Exhibit, International Amphitheatre, West 42nd and South Halsted St., Chicago, each mounted and labeled with name of subject, name of metallographer, classification, etchant, magnification.

Classification of Micrographs

1: Cast irons.
2: Tool steels (except carbides).
3: Irons and steels (including stainless).
4: Light metals and alloys.
5: Heavy nonferrous metals and alloys.
6: Powder metals (and carbides) and products.
7: Weld structures (including brazed and similar joints).
8: Surface phenomena (including corrosion products and electroplates).
9: Series of micros showing transitions or changes during processing.
10: Macrographs of metallurgical objects or operations (10 diameters or less).
11: Results by nonoptical or other unconventional techniques.

Determined experimentally using a pressure ionization chamber and an X-ray tube to which constant potential was applied. Agreement with other laboratories is satisfactory. 14 ref.

11-132. Les Essais Aux Ultra-sons. (Tests Using Ultrasonic Vibrations.) C. H. Desch. *Revue de Metallurgie*, v. 43, Sept-Oct. 1946, p. 253-256.

Various methods by which supersonic waves are used to detect cracks and other defects in metals. Other industrial uses for supersonic waves. 14 ref.

11-133. A Microhardness Tester. H. Lloyd. *Journal of Scientific Instruments*, v. 24, July 1947, p. 186-189.

An instrument of simple design for measuring the hardness of a material at microscopically determined points on its surface. Its construction, calibration and use.

11-134. Mechanism of Thermal-Shock Failure in Enamelware; an Oven-Test Method. J. C. Richmond and W. N. Harrison. *Journal of the American Ceramic Society*, v. 30, Aug. 1, 1947, p. 227-236.

Enameled utensils were tested by heating in an oven to a predetermined temperature, then quenching with ice water. This process was repeated for successively higher temperatures from 375 to 600° F. until the specimens chipped or withstood heating after the tenth quench. Failures originate in cracks formed during quenching from stresses produced by rapid cooling and shrinking of the surface of the enamel.

Section 11. For additional annotations indexed in other sections, see:
1-97; 2-153; 3-217-220; 4-93-98-102; 7-284; 8-121; 10-139; 14-230; 16-97; 18-172-173; 19-268; 23-262; 27-164.

12 INSPECTION AND STANDARDIZATION

12-141. Magnetic Particle Inspection of Weldments. S. L. Henry. *Metal Progress*, v. 52, July 1947, p. 88-90.

A report on a conference of 200 welding engineers held in May by Magnaflux Corp. in Chicago.

12-142. Radiography in the Development of Foundry Practice. G. H. Blackburn. *Walworth Today*, v. 7, March-April 1947, p. 4-5, 8-10.

Descriptive and illustrated.

12-143. Chemistry in Quality Control. Richard B. Faurote. *Aero Digest*, v. 55, July 1947, p. 78, 124.

Use of miscellaneous laboratory techniques in control of the quality of the materials used in aircraft construction.

12-144. Inspection in a Mechanized Foundry. P. Cook. *Proceedings of the Institute of British Foundrymen*, v. 39, 1945-1946, p. B32-B45.

Methods used illustrated by many photographs.

12-145. Induction of Residual Magnetization by an Alternating Current. A. V. Altma and R. I. Ianus. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 143-152. (In Russian.)

The theoretical basis of the use of alternating current in the Magnaflux method of inspection. 12 ref.

12-146. Investigation of the Action of the "Remanence Deflectoscope" in an Alternating Current. A. V. Altma and R. I. Ianus. *Journal of Technical Physics (U.S.S.R.)*, v. 17, no. 2, 1947, p. 153-160. (In Russian.)

Results of an experimental investigation of the effects of different factors on the Magnaflux method of inspection for defects in metals.

12-147. Automatic Inspection System. Charles W. Warren. *Machine Design*, v. 19, July 1947, p. 127-129.

Mechanical-gaging contacts handle only minute currents which control thyratron amplifier grids.

12-148. Report of Committee A-5 on Corrosion of Iron and Steel. *American Society for Testing Materials Preprint 4*, 1947, 15 p.

Proposed tentative specifications for long terne iron or steel sheets and proposed tentative test method for weight and composition of coatings on long terne sheets by the triple spot test.

12-149. Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. *American Society for Testing Materials Preprint 14*, 1947, 21 p.

The determination of elongation of sand-cast light alloy test bars, by F. M. Howell. Proposed tentative specifications for aluminum and aluminum-alloy extruded bars, rods, and shapes and for sheet and plate for use in pressure vessels.

12-150. A New Type of Magnetic Flaw Detector. Carlton H. Hastings. *American Society for Testing Materials Preprint 22*, 1947, 9 p.

A practical inspection test method, including instrumentation, for the bore of ferrous tubes or cylinders. This new tool paves the way toward semi-automatic inspection of parts which previously required tedious visual procedures. The possibility of calibrating the instrument to measure surface-flaw depth.

12-151. Supersonic Inspection for Internal Fissures in Cast Rolls. John Dugan. *Steel*, v. 121, July 28, 1947, p. 80-81, 95, 97.

How exact location of fissures on interior of rolls up to 18 ft. long and transverse size and shape of ruptures can be determined by use of the reflectoscope. Details of its construction and operation.

12-152. One-Millionth-Second Radiography and Its Applications. Charles M. Slack and Donald C. Dickson. *Proceedings of the I.R.E.*, v. 35, June 1947, p. 600-606.

Development and principles; applications to various radiographic problems requiring short exposure times such as exploding shells and bombs 11 ref.

12-153. Electronic Comparators. *Automobile Engineer*, v. 37, July 1947, p. 271-272.

Applications to inspection of metals.

12-154. Nondestructive Inspection of Mine Hoist Cable. P. E. Cavanagh and R. S. Segsworth. *Transactions of American Society for Metals*, v. 38, 1947, p. 517-545; discussion, p. 545-550.

Development of a practical nondestructive method for inspection of wire rope while in service. Fundamental relationships between the magnetic and electrical properties and increases in stress in wire ropes. Tests under normal operating conditions to determine whether the fundamental relationships between stresses in wire rope and instrument readings still held at high hoisting speeds.

12-155. Slip Gages. C. G. Greenham. *Discovery*, v. 8, July 1947, p. 216-219.

Their manufacture in Australia and some new types devised during the war.

12-156. Inspection and Despatch in a Steel Wire Mill. C. Coates. *Wire Industry*, v. 14, July 1947, p. 381-383.

Organization and administration of inspection department.

12-157. Quality Control at Cadillac Based on Latest Methods. *Automotive Industries*, v. 97, Aug. 1, 1947, p. 27, 74.

A general description.

12-158. A.S.T.M. Reports on Casting Specifications. Frank G. Steinebach. *Foundry*, v. 75, Aug. 1947, p. 91, 214, 216.

Papers and committee reports presented at annual meeting, June 16 to 20, 1947.

12-159. Present Status of Grinding Wheel Testing. M. Lang and M. Riedl. *Industrial Diamond Review*, v. 7, July 1947, p. 195-197.

A survey of the present position of grinding wheel testing, particularly in Germany since the war.

12-160. Rail Steel Products. Parts I and II. *American Machinist*, v. 91, Aug. 14, 1947, p. 143, 145.

Permissible variations in sizes and shapes.

12-161. Recent Developments in Casing Standards and Design. John Wais, Jr. *Drilling Contractor*, v. 3, June 15, 1947, p. 54-58.

Developments in thread makeup; effect of notching and flattening; high-pressure testing; coupling stresses; and high-strength casing joints in oil-well casing.

12-162. H-Band Method Tailors Steel to Function of Part. P. R. Wray and R. W. Roush. *SAE Journal*, v. 55, Aug. 1947, p. 17-20.

Use of hardenability-band specification method in selection of steels.

Section 12. For additional annotations indexed in other sections, see:
7-299-314; 8-115; 11-110-129-132; 24-226.

13 PYROMETRY Temperature Control

13-38. Monitors for Molten Metals. John Markus. *Scientific American*, v. 177, Aug. 1947, p. 64-66.

Use of electronic controlling and measuring devices for metallurgical furnaces.

14 FOUNDRY PRACTICE

14-204. Recent Developments in Magnesium. J. C. McDonald. *Metal Progress*, v. 52, July 1947, p. 83-87.

Important improvements in foundry techniques, need for simplified designs, and some examples of test programs, which furnish the data whereby these simplifications can be confidently adopted. (To be continued.)

(Turn to page 38)

Metal Forms
(Castings, Tubing, Fasteners, Parts)

Acme Aluminum Foundry Co. Booth 2301. Aluminum and magnesium castings.

Advance Aluminum Castings Corp. Booth 2210. Sand castings; permanent mold castings; aluminum cookware and other products.

Alloy Casting Co. Booth 246. Jet propulsion engine castings; stainless centrifugal pump castings, valves, fittings.

American Brake Shoe Co. Booth 342. Heat and corrosion resistant castings; alloy steel and iron castings; Meehanite castings; brass and bronze castings; upset and drop steel forgings.

American Brass Co. Booth 939. Copper sheet, wire, rod, seamless tubes, extruded shapes.

American Emblem Co., Inc. Booth 1521. Embossed metal nameplates; stampings; badges; insignia.

Ampco Metal, Inc. Booth 110. Sand and centrifugal castings, forgings, extruded rod and tube, and parts made of bronze.

Arwood Precision Casting Corp. Booth 932. Lost-wax precision castings, ferrous and nonferrous.

Aurora Metal Co. Booth 2009. Aluminum bronze die castings.

Austenal Laboratories, Inc. Booth 149. Microcastings in S.A.E. and N.E. steels, stainless, heat and corrosion resistant alloys, and high cobalt-chromium alloys.

Automatic Bending Co. Booth A-1815. Flat panels with various bends; special tube applications; difficult angles.

Bridgeport Brass Co. Booth 1251. Brass and copper sheet, rod, wire, tubing, welding rod.

Cambridge Wire Cloth Co. Booth 2640. Metal mesh conveyer belts; wire cloth and screening; fabricated metal products.

Carboloy Co., Inc. Booth 1142. Cemented carbide wear resistant parts.

Cherry Rivet Co. Booth 1223. Aluminum, steel and monel blind rivets and tools for installation.

Chicago Steel Foundry Co. Booth 310. Heat, corrosion and abrasion resistant castings; carbon steel castings.

Driver Co., Wilbur B. Booth 235. Resistance wire and alloys.

Fahralloy Co. Booth 2408. Stainless steel and heat resisting alloy castings.

Fansteel Metallurgical Corp. Booth 2115. Carbide tools and dies; cast alloy tools; electrical contacts; selenium rectifiers; hard facing metals.

Ferro Bronze Corp. Booth 1822. Gray iron and bronze castings; wood and metal patterns and models.

Frontier Bronze Corp. Booth 1115. Aluminum alloy castings; extruded shapes; drawn tubing; rolled sheets.

General Alloys Co. Booth 640. Heat and corrosion resistant castings; furnace parts.

General Plate Division, Metals & Controls Corp. Booth 1817. Laminated precious metals in wire, tubing and flat stock; thermostatic metal; electrical contacts.

Gerity-Michigan Die Casting Co., Inc. Booth 1606. Zinc die castings.

Globe Imperial Corp. Booth 2110. Zinc and aluminum die-cast products.

Goodrich Co., B. F. Booth 1315. Rivnuts (fasteners).

Greenlee Foundry Co. Booth 2830. Gray iron and Meehanite castings.

Hardy, Inc., Charles. Booth 1618. Powder metal parts.

Harper Co., H. M. Booth 1910. Bolts, nuts, screws, washers, rivets, nails made from nonferrous, stainless steel and other corrosion resistant alloys.

Harvey Machine Co. Booth 1810. Aluminum and brass extrusions, rods, bars and special shapes, automatic screw machine products.

Haynes Stellite Co. Booths 838 and 840. High-temperature alloy castings; precision castings.

Hydraulic Press Mfg. Co. Booth 522. Die-cast samples.

Janney Cylinder Co. Booth 184. Finish machined centrifugal castings of alloy irons, stainless steels, bronze, monel and alloy steels.

Jones & Laughlin Steel Corp. Booth 442. Strip and sheet; beams; channels; wire rope; tin plate.

Joslyn Mfg. & Supply Co. Booth 236. Stainless steel rounds, squares, hexagons, flats, angles, channels, wire.

Kennametal, Inc. Booth 2613. Cemented carbide wear resistant parts.

Kerr Mfg. Co. Booth 2625. Lost-wax investment castings.

La Salle Steel Co. Booth 2508. Parts made from Stressproof and cold finished steel bars.

Lead Industries Association. Booth 1602. Lead-lined tanks; lead pipe; lead for protection against radiation.

Lester-Phoenix, Inc. Booth 1316. Aluminum and zinc die castings.

Michiana Products Corp. Booth 2720. Heat, corrosion and abrasion resistant alloy castings.

New Jersey Zinc Co. Booth 1706. Zinc alloy die castings.

Ohio Seamless Tube Co. Booth 1321. Seamless and electric welded formed and fabricated steel tubular products.

Ohio Steel Foundry Co. Booth 151. Heat and corrosion resistant castings; electric steel castings.

Page Steel and Wire Division, American Chain & Cable Co. Booth 1219. Stainless and high and low carbon steel wire; shaped wire.

14-205. Installation du Moulage Mecanique Pour la Production de Petites et Moyennes Pieces. (Installation of Mechanical Molding for the Production of Small and Medium Objects.) Roger Lesage. *Fonderie*, no. 14, Feb. 1947, p. 541-545.

The mechanical casting of small parts such as constituents of hydraulic turbines and mechanical tools. Production increased 2½ times.

14-206. Modern Sand Casting. Thomas A. Dickinson. *Tool Engineer*, v. 18, July 1947, p. 39-43.

Recent innovations on the West Coast.

14-207. Making Plastic Patterns. E. J. McAfee. *American Foundryman*, v. 12, July 1947, p. 26-31.

Design and construction techniques.

14-208. Foundry Sand Reclamation. J. M. Cummings and W. M. Armstrong. *American Foundryman*, v. 12, July 1947, p. 35-39, 65.

Report on first phase of foundry research program sponsored by the British Columbia Research Council.

14-209. Flame Gouging; Applications in the Steel Foundry. J. A. Shuffstall. *American Foundryman*, v. 12, July 1947, p. 62-63.

Chipping operations in a foundry and the substitution of flame gouging for certain of these applications. Need of training of personnel in this work.

14-210. Casting Is Changing. Edwin Laird Cady. *Scientific American*, v. 177, Aug. 1947, p. 67-69.

New foundry techniques.

14-211. La Coulee Continue des Alliages Legers. (Continuous Casting of Light Alloys.) J. M. Peloutier. *Revue de l'Aluminium*, v. 24, March 1947, p. 84-93.

A water-cooled ingot mold, the base of which drops out at specified intervals, is used for continuous casting. Several variations of this mold suggested; data for dimensions and speeds.

14-212. Over het Voorkomen van Inwendig Glanzende Gietgallen bij het Gieten in Natte Zandvormen. (Appearance of Internally Bright Gas Holes on the Surface of Gray Cast Iron Where Green Sand Molds Are Used.) J. G. Hofman. *Metalen*, v. 1, May 1947, p. 158-160.

How investigations of such defects led to their explanation and to a method for avoiding or minimizing them.

14-213. The Centrifugal Casting of Copper Alloy Wheels in Sand Molds. O. R. J. Lee and L. Northcott. *Engineering*, v. 163, June 27, 1947, p. 556-560.

Influence of casting speeds and conditions and of segregation and structure on centrifugal sand castings of aluminum bronze, high-tensile brass, gunmetal, leaded gunmetal, and phosphor bronze. (Condensed from paper presented to the Institute of Metals.)

14-214. Reclamation of Foundry Sand. J. M. Cummings and W. M. Armstrong. *Western Miner*, v. 20, July 1947, p. 44-48.

The various methods for sand reclamation and results of a pilot-plant investigation of wet scrubbing in conjunction with furnace treatment and magnetic separation, especially as applied to local conditions in British Columbia.

14-215. Foundry Coke; Characteristics and Quality Factors. D. E. Krause and H. W. Lownie, Jr. *American Foundryman*, v. 12, July 1947, p. 47-58.

Reviews and summarizes published information on foundry coke, and presents test data to aid in prediction of the behavior of foundry cokes in cupola practice. (The review is based on *Chemical Abstracts* for 1936 to 1945.) 154 ref.

14-216. Procédés a Utiliser pour Corriger les Défauts Constatés dans le Moulage d'une Vis sans Fin. (Methods Used to Correct Defects Occurring in Casting an Endless Screw.) Pierre Simon and Gabriel Joly. *Fonderie*, May 1947, p. 655-657.

Fourteen steps in the preparation of a closed mold for casting an endless screw.

14-217. Fusion au Cubilot Avec un Coke de Tres Mauvaise Qualite. (Melting in a Cupola Furnace With Very Low Quality Coke.) Henry Gernelle. *Fonderie*, May 1947, p. 658-663.

A fuel for cupola-furnace melting, which has high porosity, low mechanical resistance, and high ash content. Changes in structure of cupola parts and variations in procedure to compensate for the poor coke.

14-218. Precision Casting. H. Evans, P. S. Cotton, and J. Thexton. *Metal Industry*, v. 71, July 4, 1947, p. 3-6; July 11, 1947, p. 23-26.

Technique used for high melting-point nickel alloys based on the use of zircon flour in the sprayed coating and of sillimanite in the investment.

14-219. Precision Casting of High Melting-Point Alloys Containing Nickel. Part II. H. Evans, P. S. Cotton, and J. Thexton. *Foundry Trade Journal*, v. 82, July 10, 1947, p. 223-227.

Details of recommended procedure based on the use of zircon flour in the sprayed coating and of sillimanite in the investment. 49 ref.

14-220. A Dry Sand Core Is Suggested. W. Gudgeon. *Foundry Trade Journal*, v. 82, July 10, 1947, p. 228.

How a peculiar shaped casting was produced much more easily with dry sand than with green sand.

14-221. Control of Bronze Melts for the Production of Pressure-Tight Castings. W. A. Baker. *Foundry Trade Journal*, v. 82, July 10, 1947, p. 229-233.

Work done over the past ten years by British Non-Ferrous Metals Research Assoc. on controlling porosity of tin-bronze castings.

14-222. Pressure Tightness; The Control of Porosity in Bronze Sand Castings. W. A. Baker. *Metal Industry*, v. 71, July 18, 1947, p. 43-46.

Work carried out during the past ten years by the British Non-Ferrous Metals Research Assoc.

14-223. Steel Casting Design Details Affect Quality of Product. Frank Kiper. *Product Engineering*, v. 18, Aug. 1947, p. 86-89.

Directional solidification and its control in the production of sound steel castings. Temperature gradient is divided into a transverse component and a longitudinal component. The use of the components by the designer to improve the quality of steel castings.

14-224. Blowing Cores on a Mass Production Basis. Maurice F. Degley. *Foundry*, v. 75, Aug. 1947, p. 72-74, 247.

Equipment, layout, and procedures for daily production of cores for 450 tons of automotive castings, such as cylinder heads and blocks, in the core department of Ferro Machine & Foundry, Inc., Cleveland.

14-225. The Casting of a Gray Iron Diesel Engine Liner. Noah A. Kahn and Bernard N. Ames. *Foundry*, v. 75, Aug. 1947, p. 66-71, 218-220.

The manner in which a jobbing shop can adapt itself to production casting in an emergency. How the New York Naval Shipyard solved the problem of producing 500 castings per month.

14-226. Conditions Affect Choice of Molding Method. Pat Dwyer. *Foundry*, v. 75, Aug. 1947, p. 82-83, 222, 224, 226.

Factors which influence choice. Design principles.

14-227. Producing Steel Castings by the Thermit Process. Robert C. Wayne. *Foundry*, v. 75, Aug. 1947, p. 84-87, 204, 206, 208, 210, 212, 214.

Process developed by the U. S. Navy during World War II, by which heats of up to several hundred pounds of carbon or alloy steel can be melted in 1 or 2 min.

14-228. Foundry Expansion Aids Production and Working Conditions. William G. Gude. *Foundry*, v. 75, Aug. 1947, p. 94-96, 174-175.

Equipment, layout, and procedures followed at Christensen & Olsen Foundry Co., Chicago, in production of nonferrous castings of varied sizes and types.

14-229. Institute of British Foundrymen Holds 44th Annual Meeting. Vincent Delport. *Foundry*, v. 75, Aug. 1947, p. 97, 132, 134, 137.

Reviews of papers presented.

14-230. Determining Sand Moisture by Electrical Instrument. Charles Locke and Fred De Hudy. *Foundry*, v. 75, Aug. 1947, p. 180, 182.

Instrument described is claimed to be superior to the one described by Liddiard and Seal in *Foundry Trade Journal* for Nov. 14, 1946, in that it provides for controlled ramming of the sample, as well as for control of the other variables involved.

14-231. Principles of Precision Investment Casting. Part I. Kenneth Geist and Robert M. Kerr, Jr. *Foundry Trade Journal*, v. 82, July 17, 1947, p. 247-254.

History, methods, and equipment. The making of dental castings. (To be continued.)

14-232. Wetherill Vacuum Casting Process. W. A. Phair. *Iron Age*, v. 160, Aug. 14, 1947, p. 67-70.

Better yields, reduced foundry losses, improved operating conditions, and rapid production pouring are among the advantages attributed to a vacuum-casting method developed by Armour Research Foundation for Wetherill Engineering Co. Construction and operation of the unit and a typical steel-casting pouring cycle.

14-233. Principles of Precision Investment Casting. Part II. Kenneth Geist and Robert M. Kerr, Jr. *Foundry Trade Journal*, v. 82, July 24, 1947, p. 269-273.

Wax elimination, firing of mold, and melting and casting. (To be continued.)

14-234. Casting Fastening Hardware With Dies and Metal Molds. Herbert Chase. *Steel*, v. 121, Aug. 18, 1947, p. 94-96, 98, 130, 132, 134.

In processing shields and other components used with expansion bolts and similar fastenings, units, often including threads, are cast from zinc and lead alloys at a high production rate.

14-235. Continuous Casting. H. Kastner. *Metal Industry*, v. 71, Aug. 1, 1947, p. 83-85.

German developments in the nonferrous field. (Abstracted from *Stahl und Eisen.*)

Section 14. For additional annotations indexed in other sections, see: 2-195; 3-235; 9-99-100-101; 12-142-144-149-158; 15-26; 16-102; 23-260; 23-275; 24-247; 25-103-104-106-107; 27-159.

15 SALVAGE AND SECONDARY METALS

15-26. Difficultes Rencontrees a L'Emploi d'Alliages Legers de Deuxieme Fusion Pour Coulee De Pieces en Coquilles. (Difficulties Encountered in the Use of Light Alloys for Casting.) Jean Duport. *Fonderie*, no. 14, Feb. 1947, p. 527-538.

Two specific cases of difficulties arising from the use of scrap light alloys in making small castings. Various types of scrap alloys, methods of control and treatment, and the properties of casting metals.

(Turn to page 40)

Metal Forms (Cont.)

Parker-Kalon Corp. Booth 2404. Self-tapping screws; socket set screws; socket head cap screws.

Permanente Products Co. Booth 304. Products made of aluminum sheet, plate, coil and circles; pig and ingot; roofing sheet; utility sheet.

Roebling's Sons Co., John A. Booth 1342. Wire and cold rolled products; wire rope and fittings; woven wire fabrics.

Scovill Mfg. Co. Booth 532. Extruded cold heading wire (cartridge brass); other brass mill products.

Shakeproof, Inc. Booth 2502. Lock washers; fastening units.

Stevens Co., Charles G. Booth 1332. Steel and nonferrous wires.

Stoody Co. Booth 829. Wear resistant castings.

Superior Tube Co. Booth 1805. Small tubing, fabricated parts and applications.

Tinnerman Products, Inc. Booth 210. Speed Nuts and Speed Clips.

Titanium Alloy Mfg. Co. Booth 2607. Titanium and zirconium alloy products.

Trent Tube Mfg. Co. Booth 1621. Welded tubing of stainless steel, monel and Inconel.

Foundry Equipment and Supplies

Ajax Electrothermic Corp. Booth 1151. High-frequency electric induction furnaces for melting; converter and generator-operated equipment.

Ajax Engineering Corp. Booth 1051. Low-frequency induction aluminum melting furnaces.

Alox Corp. Booth 141. Core oil substitutes.

American Wheelabrator & Equipment Corp. Booth 910. Blast cleaning machines; dust collectors.

Brickseal Refractory Co. Booth 1917. Refractory coatings; fuel oil solvent.

Bristol Co. Booth 339. Recording gage and thermometer; cycle controller; resistance thermometer.

Brown Instrument Co. Booth 1138. Potentiometer pyrometers; thermometers; flame failure safeguard.

Continental Industrial Engineers, Inc. Booth 521. Industrial furnaces; process lines; complete plants.

Despatch Oven Co. Booth 1921. Core and mold ovens; heaters.

Detroit Electric Furnace Division. Booth 2916. Rocking electric furnaces for iron and bronze foundries.

Dietert Co., Harry W. Booth 1019. Foundry sand testing and control equipment.

Ecco High Frequency Corp. Booth 921. High-frequency melting equipment; centrifugal casting machine.

Electro Refractories & Alloys Corp. Booth 240. Refractories and crucibles; furnace cements; nonferrous fluxing alloys; graphite stopper heads.

Foxboro Co. Booth 926. Pyrometers.

Gas Appliance Service, Inc. Booth 620. Gas-air mixer; direct-fired air heaters.

Hydraulic Press Mfg. Co. Booth 522. Die-casting machine.

Illinois Testing Laboratories, Inc. Booth 920. Temperature, air and dew point measuring instruments.

Kemp Mfg. Co., C. M. Booth 719. Immersion melting units for soft metals.

Kerr Mfg. Co. Booth 2625. Investment casting materials; investments; waxes.

Kux Machine Co. Booth 1209. Die-casting machines.

Lester-Phoenix, Inc. Booth 1316. Die-casting machines for brass, aluminum and magnesium.

Lindberg Engineering Co. Booth 726. Two-chamber electric induction melting furnace.

Linde Air Products Co. Booths 838-840. Jet device for injecting oxygen into openhearth or electric furnace.

Miskella Infra-Red Co. Booth 2415. Infrared burning and baking units.

National Carbon Co., Inc. Booths 838 and 840. Carbon and graphite furnace parts; electrodes; molds; graphite powder; carbon and graphite brick.

National Engineering Co. Booth 2307. Simpson intensive mixer, laboratory size, pilot plant size and commercial mixer complete with loader and exhaust unit.

Pangborn Corp. Booth 409. Blast cleaning equipment; dust collectors.

Pyrometer Instrument Co. Booth 421. Optical, radiation, immersion, surface, indicating, bi-optical and micro-optical pyrometers.

Schrader's Son, A. Booth 2335. Pneumatic power press and machine controls; air valves; air cylinders; couplers; blow guns; hose and fittings; filters; lubricators.

Stoody Co. Booth 829. Borium blast cleaning nozzles.

Taco-West Corp. Booth 1234. Electronic pyrometers.

Tincher Products Co. Booth 1922. Material and equipment for sealing porosity in castings.

Titanium Alloy Mfg. Co. Booth 2607. Zirconium mold and core washes; zircon and zirconium oxide refractories.

Upton Electric Furnace Div. Booth 536. Melting aluminum by salt bath method.

Vacu-Blast Co., Inc. Booth 2235. Dustless blast cleaning equipment.

15-27. Steel Scrap Conversion. Hubert Swett. *Western Metals*, v. 5, July 1947, p. 16-18.

Some of the technical phases of converting steel scrap into finished steel. Why the steel industry has certain restrictions regarding scrap quality.

15-28. Gas Fluxing in Production of Secondary Aluminum. G. W. Birdsall. *Steel*, v. 121, Aug. 4, 1947, p. 88-89, 115-116, 120, 122, 124; Aug. 11, 1947, p. 86-88, 104-105.

Improved melting and refining practices in handling wide variety of aircraft body scrap with remarkably efficient recovery. Continuous gas fluxing with chlorine, combined with innovations in furnace practice, permits economical production of high-grade aluminum alloys that meet original impurity limitations of 17S or 24S. Methods for refining aluminum scrap, including a complete installation for utilizing liquid chlorine direct from tank cars.

Section 15. For additional annotations indexed in other sections, see:
21-75; 22-379-397-398-433.

16 FURNACES AND FUELS

16-91. Large Electrically Heated Oven Age Hardens Aluminum at Boeing Aircraft Plant. Fred M. Perkins. *Industrial Heating*, v. 14, July 1947, p. 1153-1154, 1156, 1158-1159.

The oven and its controls.

16-92. New Continuous Pouring Induction Melting Furnace. *Iron Age*, v. 160, July 24, 1947, p. 55.

In Lindberg-Fisher induction melting furnace for aluminum, brass, and zinc, the two chambers, one of which is for charging and the other for pouring, are connected by a series of straight line melting channels. It is claimed that the metal in the pouring chamber is always at pouring temperature, and that adding cold metal to the charging chamber does not affect temperature in the pouring chamber, within reasonable limits.

16-93. Oil Condensate Trap Designed for Smoke Exhausters. *Iron Age*, v. 160, July 24, 1947, p. 64.

Home-made trap designed to eliminate the adverse effects of oil condensation where smoke exhausters are used with heat treating furnaces.

16-94. Electric Apparatus for Three-Phase Arc Furnaces. N. R. Stansel and and A. R. Oltrogge. *The Electrochemical Society Preprint 91-25*, 1947, 11 p.

16-95. Centralization of High-Frequency Current Supply for Induction Heat Treatment Furnaces. G. V. Kliushin. *Industrial Power (U.S.S.R.)*, v. 4, no. 2, 1947, p. 4-6. (In Russian.)

A new circuit for a series of heat treatment furnaces with an automatic central control. This circuit has been used in a Russian plant where it resulted in considerable saving in manpower and electric current.

16-96. Planning a Toolroom Heat Treating Department. Part I. R. C. Onan. *Iron Age*, v. 160, July 31, 1947, p. 40-44.

Various types and sizes of heat treating and brazing furnaces and their relative capacities and applications. (To be continued.)

16-97. New Plant and Tools. *Automobile Engineer*, v. 37, July 1947, p. 261-264.

Recent developments in British production equipment include: a heat treating furnace; adjustable honing mandrels; automatic work table; Speetol-Gordon magnascope; and a steam generator.

16-98. Role of Convection in Medium Temperature Processing With Special Reference to Its Influence on the Design of "Infrared" Ovens. Part I. J. B. Carne. *Industrial Gas*, v. 26, July 1947, p. 7-9, 30, 32.

Heat transfer rates in various ovens for different materials and conditions are shown graphically. 16 ref. (To be continued.)

16-99. A Model Tin-Stack Firing System. E. J. Funk, Jr. *Industrial Gas*, v. 26, July 1947, p. 12.

System used by Tennessee Coal and Iron in their tinplate division.

16-100. New Developments in Heat Processing Equipment. F. G. Daveler. *Industrial Gas*, v. 26, July 1947, p. 13-15, 25-27.

Controlled atmospheres; accelerated drying ovens; high-speed aluminum annealing; glass dropping kilns.

16-101. Tunnel Kilns for the Firing of Enameled Sheets. E. L. Berman. *Glass and Ceramic Industry (U.S.S.R.)*, no. 2, 1947, p. 19-23. (In Russian.)

Details of the design and performance of 5 different kilns.

16-102. Dimensions et Formes Des Tuyeres de Cubilots. (Dimensions and Shapes of Tuyeres in Cupola Furnaces.) Gabriel Joly. *Fonderie*, May 1947, p. 651-654.

The application of several new principles permits logical division of the vents inside the cupola furnace, assuring even melts, and a minimum of wear of the refractory lining, and avoids oxidation of the metal.

16-103. Automatic Operation of the Electric Arc Furnace. H. G. Frostick. *Steel*, v. 121, Aug. 4, 1947, p. 104, 107, 124, 126.

How equipment for controlling the position of furnace electrodes reduces power costs, heating time and maintenance.

16-104. Silicon Carbide Radiant Tubes for Annealing Furnaces. M. H. Luttropp. *Iron Age*, v. 160, Aug. 14, 1947, p. 58-61.

Recent installation of a high temperature annealing furnace with silicon carbide radiant tubes and conveyer rolls. Various construction features of this continuous, controlled atmosphere, tube-annealing unit. A technique for predetermining furnace speed.

16-105. Production of Electric Furnace Electrodes. Lyman C. Judson. *Iron Age*, v. 160, Aug. 14, 1947, p. 62-64.

The manufacturing processes by which carbon and graphite electrodes are made by National Carbon Co.

16-106. Furnace With Mesh Belt Conveyer for Continuous Heat Treatment. *Machinery (London)*, v. 71, July 17, 1947, p. 72.

A Gibbons-Wild-Barfield furnace equipped with a mesh-belt conveyer for the continuous heat treatment of bolts and similar small parts.

Section 16. For additional annotations indexed in other sections, see:
7-315; 10-144; 14-217; 18-139-140-141; 19-255; 22-425-436.

17 REFRACTORIES Furnace Materials

17-67. Refractory Life in Side-Blown Converters. T. Bishop. *Metal Progress*, v. 52, July 1947, p. 105.

Results of a survey of 22 firms conducted in Britain. For small vessels, monolithic linings are preferred; for large, brick linings. Experiences with charging sand with iron.

17-68. Heat Losses in Furnace Linings. J. D. McCullough. *Blast Furnace and Steel Plant*, v. 35, July 1947, p. 817-823.

Methods of determining the heat losses quickly and easily. Time-temperature gradients for furnaces insulated in different ways.

17-69. Basic Openhearth Furnace Refractories and Masonry. *Industrial Heating*, v. 14, July 1947, p. 1168, 1170, 1172.

Summarizes information presented at session of 30th Conference of the National Open Hearth Steel Committee of the A.I.M.E., Cincinnati. (To be continued.)

17-70. Relation of Refractory Economy to Combustion in Steel Mill Practice. E. N. Hower. *Industrial Heating*, v. 14, July 1947, p. 1174, 1176-1177.

Condensation of paper originally presented before 1946 Convention of the Association of Iron & Steel Engineers, Cleveland.

17-71. Synthesis of Magnesium Aluminate by the Alumothermal Method. R. L. Pevzner. *Comptes Rendus de l'Académie des Sciences de l'U.R.S.S.*, v. 55, no. 3, 1947, p. 233-235. (In English.)

An experimental investigation of a process for manufacture of the above spinel based on the Goldschmidt reaction. Details of a study of the structure of the material thus prepared.

17-72. Modern Refractory Materials. G. Fitzgerald-Lee. *Refractories Journal*, v. 23, June 1947, p. 199-202.

Types in use today; B.S.I. specifications; jointing materials; acid resisting refractories.

17-73. Carbon Hearths for Blast Furnaces. *Refractories Journal*, v. 23, June 1947, p. 210-212.

German practice as reported in B.I.O.S. Final Report No. 819.

17-74. Heat Losses in Furnace Linings. J. D. McCullough. *Petroleum Refiner*, v. 26, July 1947, p. 112-117.

Methods of determining losses because of heat stored in and conducted through furnace linings.

17-75. Refractories in the German Iron and Steel Industry. *Iron Age*, v. 160, Aug. 14, 1947, p. 66.

Outline of German practice as reported in *Iron and Coal Trades Review*, March 14, 1947.

17-76. Refractories. Hobart M. Kraner. *Ceramic Age*, v. 50, July 1947, p. 45-48.

Developments over past 25 years.

Section 17. For additional annotations indexed in other sections, see:
8-123.

18 HEAT TREATMENT

18-135. Planning the Forge Shop for High-Frequency Heating. George F. Applegate. *Steel*, v. 121, July 14, 1947, p. 84-86, 124, 127-128.

Plant layout and material handling methods. Advantages of high frequency heating.

18-136. Precipitation Hardening. Part IV. L. Sanderson. *Chemical Age*, v. 57, July 1947, p. 13-15.

The aging of duralumin; alloying of aluminum with manganese and silicon; precipitation hardening of copper-base alloys; ternary copper alloys; industrial uses. (To be continued.)

18-137. Various Types of Heat Treating Handled in One Installation. *Steel*, v. 121, July 21, 1947, p. 99, 142.

Facilities of Dayton, Ohio, plant of Dayton Forging & Heat Treating Co.

(Turn to page 42)

Heat Treating Equipment and Supplies

Ajax Electric Co., Inc. Booth 1054. Salt bath furnaces for martempering, austempering, cyclic annealing, brazing and other heat treatments.

Ajax Electrothermic Corp. Booth 1151. High frequency electric induction furnaces; converter and generator-operated equipment.

Alloy Casting Co. Booth 246. Heat resistant carburizing retorts, baskets, fixtures, trays, boxes, chain.

American Brake Shoe Co. Booth 342. Heat and corrosion resistant alloy steel castings.

American Cyanamid Co. Booth 850. Information on salt bath heat treating.

American Gas Furnace Co. Booth 819. Industrial heating appliances; gas furnaces and burners.

Baker & Co., Inc. Booth 1505. Industrial and laboratory furnace; Purifier, indicator and Puridryer.

Bell & Gossett Co. Booth 421. Quenching equipment—oil coolers, quench tanks, pumps and controls.

Bristol Co. Booth 339. Dilatometer; recording gage and thermometer; cycle controller; resistance thermometer.

Brown Instrument Co. Booth 1138. Potentiometer pyrometers; pneumatic and electric controllers; thermometers; flame failure safeguard.

Bryant Heater Co. Booth 710. Gas combustion equipment; burners; mixers; blowers.

Budd Co. Booth 935. Induction heating and heat treating equipment.

Burdett Mfg. Co. Booth 1426. Infrared drying ovens.

Cambridge Wire Cloth Co. Booth 2640. Metal mesh conveyer belts for high temperature.

Chicago Steel Foundry Co. Booth 310. Heat, corrosion and abrasion resistant castings.

Cincinnati Milling and Grinding Machines, Inc. Booth 2702. Flamatic hardening machine for production heat treatment.

Commonwealth Edison Co. Booth 2002. Industrial use of electric power.

Continental Industrial Engineers, Inc. Booth 521. Special machines; industrial furnaces; process lines; complete plants.

Delaware Tool Steel Corp. Booth 1026. fired ovens and furnaces; air heaters.

Despatch Oven Co. Booth 1921. Gas-Controlled atmosphere furnaces.

Ecco High Frequency Corp. Booth 921. Induction heat treating and brazing equipment.

Eclipse Fuel Engineering Co. Booth 610. Gas furnaces; ovens; burners; mixers; blowers.

Electric Furnace Co. Booth 833. Gas, oil and electric furnaces for all heat treating processes and brazing; special atmosphere equipment.

Fahralloy Co. Booth 2408. Stainless steel and heat resisting alloy castings.

Foxboro Co. Booth 926. Potentiometer recorder controllers; temperature control, indicating and recording gages.

Gas Appliance Service, Inc. Booth 620. Gas-air mixer; flame hardening unit; direct-fired air heaters.

General Alloys Co. Booth 640. Heat and corrosion resistant castings; carburizing containers; retorts and muffles; trays and conveyers.

General Electric Co. Booth 1128. Electric heating furnaces and devices.

Gordon Electronics, Inc. Booth 1250. Radio frequency induction heating machines.

Gordon Co., Claud S. Booth 525. Furnace atmosphere indicator; temperature controls; gas-fired box furnace; electric laboratory furnace; thermocouples, protecting tubes, insulators and lead wires.

Harmon & Co. Booth 1904. Gas furnaces and parts.

18-138. Convection Annealing Large Diameter Tin-Plate Coils. Walter F. Toerge. *Steel*, v. 121, July 21, 1947, p. 130, 132, 134, 137, 140.

Technique of applying heat to coil edges rather than transversely through laminations which reduces total bright annealing processing time to 34 hr. on 46-in o.d. coil.

18-139. Furnace Atmospheres for Sintering. Part II—Dissociated Ammonia and Partially Burned Fuel Gas. H. M. Webber and A. G. Hotchkiss. *Industrial Heating*, v. 14, July 1947, p. 1084, 1086, 1088, 1090, 1092, 1094, 1096.

Equipment and procedures for producing and purifying the above atmospheres. (To be continued.)

18-140. Dayton Forging and Heat Treating Co. Features Salt Bath Furnaces for Commercial Heat Treating. *Industrial Heating*, v. 14, July 1947, p. 1182, 1184, 1186, 1188.

Facilities of this company.

18-141. Forging Failure Caused by Carbon Pickup. Martin B. Graham. *Iron Age*, v. 160, July 24, 1947, p. 65-67.

Investigation of a fracture in a forged steel link which led to the conclusion that the failure was caused by carbon pickup during a heating operation with oil-fired furnaces. Points out the need for checking heating furnaces for excessive carbon deposits.

18-142. Treating Steels by Induction Heating. R. A. Whiteman. *Radio News (Engineering Dept.)*, v. 37, May 1947, p. 16-19.

Metallurgical properties of steel and their dependence on heat treatment.

18-143. Die Aufkohlung von Stahlen als Reaktion im festen Zustand. (The Carburization of Steel as a Reaction in the Solid State.) H. Stager, E. Brandenberger, and E. Kobel. *Schweizer Archiv*, v. 12, April 1947, p. 97-113.

Contradictions found in the technical literature as to whether the carburization of steels is a solid or gas-phase reaction are partially clarified by experimental work. The absorption of carbon, when a solid carburization agent is used, under certain conditions, may be assumed to be a solid-phase reaction.

18-144. Effect of Artificial Aging on Tensile Properties and Resistance to Corrosion of 24S-T Aluminum Alloy. Hugh L. Logan, Harold Hessing, and Harold E. Francis. *Journal of Research of the National Bureau of Standards*, v. 38, May 1947, p. 465-468.

Effects of aging at various temperatures and times.

18-145. Contribution a l'Etude des Toles Extra Douces Ecrouies Traitements Thermiques. (Contribution to the Study of Extra-Mild Cold Worked Sheet Steel.) J. Yourtaieff. *Revue de Metallurgie*, May-June 1946, p. 162-168.

Relaxation treatment, low-temperature polishing, and normalizing of sheets of Martin steel.

18-146. Heat Treating Aircraft Blades Made From Steel Tubing at American Propeller Corporation. Part II. *Industrial Heating*, v. 14, July 1947, p. 1074-1078, 1080.

Concluded.

18-147. Armor Plate. *Iron and Steel*, v. 20, July 1947, p. 369-370.

Gas carburizing process as conducted in Germany.

18-148. One Salt Bath for Both Carburizing and Cyaniding. Frank Steigerwald. *Materials & Methods*, v. 26, July 1947, p. 75-77.

Through oxygen activation the same salt bath can be used for both cyaniding and carburizing. The new bath permits close control of case depth, rapid carburization, and easy cleaning of parts after quenching. Oxygen is used during carburizing but not for cyaniding.

18-149. The Ignition of Magnesium Alloys During Heat Treatment. C. B. Willmore and W. S. Peterson. *Materials & Methods*, v. 26, July 1947, p. 85-88.

A series of ignition-point tests conducted on two common magnesium alloys indicate that fire hazards result from accidental contact with materials which form low-melting alloys, slivers, burrs and sharp edges. Under certain conditions, ignition occurred below the melting point of the alloy.

18-150. Spray Quench for Tubular Assemblies. Walter H. Holcroft. *Materials & Methods*, v. 26, July 1947, p. 134.

For large and bulky parts.

18-151. Tempering Toolsteels. George A. Roberts. *Steel*, v. 121, July 28, 1947, p. 72-74, 98, 100.

Complete data on the interrelationships of hardness, tempering time, and tempering temperature of three important high speed steels in common use. (To be continued.)

18-152. Warmtebehandeling van Kettingen. (Heat Treatment of Chains.) M. G. Van Der Steeg. *Metalen*, June 1947, p. 190-192.

Compares annealing, normalizing, and hardening followed by tempering for chains during fabrication and after use, with special attention to their influence on the impact strength of the material.

18-153. Industrial Applications of High Frequencies. *Brown Boveri Review*, v. 33, Oct. 1946, p. 314-315.

Applications of Brown-Boveri equipment to the surface hardening of steel parts and other processes.

18-154. Hardenability and Strength of Casehardened Machine Steel. (Concluded.) J. E. Erb and D. M. Woolf. *Steel Processing*, v. 33, July 1947, p. 417-419.

Tests showed that light casehardening provides a hard, wear resisting surface without sacrifice of either strength or durability, on a steel containing 0.18% C, 0.40% Mn, 0.040% P, 0.050% S, and 0.25% Si.

18-155. Suspended Carburization. O. E. Cullen. *Steel Processing*, v. 33, July 1947, p. 431-436.

Recently developed process and equipment whereby a charge of steel undergoing carburization can be placed in a state of suspension for an indefinite period without harmful effect to the charge, after which carburization can be resumed at the point where it was halted.

18-156. Toolsteels. Part VII. L. Sanderson. *British Steelmaker*, v. 13, July 1947, p. 350-355.

Grinding; hardening temperatures; quenching; tempering; annealing and requenching; quenching media; and heating effects.

18-157. A Laboratory Study of Quench Cracking in Cast Alloy Steels. M. C. Udy and M. K. Barnett. *Transactions of American Society for Metals*, v. 38, 1947, p. 471-485; discussion, p. 485-487.

A laboratory test to demonstrate the effects of chemical composition and heat treatment variables upon the sensitivity of steel to quench cracking. Composition was the most potent variable studied and, of the individual elements promoting cracking, carbon was the most powerful.

18-158. Stress Cracking of Electroplated Lockwashers. K. B. Valentine. *Transactions of American Society for Metals*, v. 38, 1947, p. 488-494; discussion, p. 494-504.

Tests on electroplated lockwashers show the effects of hardness variations on stress cracking. Recommended procedures for eliminating hydrogen embrittlement by thermal aging.

18-159. Age Hardening Copper-Cobalt-Manganese Alloys. Jay W. Fredrickson. *Transactions of American Society for Metals*, v. 38, 1947, p. 593-616; discussion, p. 616-617.

Alloys containing 2 to 4% Co and up to 15% Mn have hardenable characteristics and the ability to harden from Rockwell F-67 to Rockwell B-81 from an annealed condition. The optimum treatment consists of aging at 900, 1000, and 1100° F.

18-160. Electrometallurgy in Canada. J. L. Balleny. *Electrical Engineering*, v. 66, Aug. 1947, p. 774-778.

Steel strip annealing; wire patenting; aluminum heat treatment; induction heating; regulation of melting furnaces; alloy steel melting. (From paper "Electric Furnace Practice in Canada," presented at A.I.E.E. summer general meeting, Montreal, Canada, June 9 to 13, 1947, and scheduled for publication in *A.I.E.E. Transactions*, v. 66, 1947.)

18-161. Bainitic Hardening of High Speed Steel. C. K. Baer and P. Payson. *Transactions of American Society for Metals*, v. 39, 1947, p. 488-513; discussion, p. 514-520.

If partially transformed steel is heated for several hours at 1050° F., cooled to between 450 and 600° F., and held for some time, additional bainite can form. Thus, by combinations of transformation and tempering periods, it is possible to heat treat high speed steel to a structure consisting almost entirely of tempered bainite. Cutting tests show that bainitic high speed tools outperform tools of the same steels heat treated by conventional methods. 18 ref.

18-162. Changes in Size and Toughness of High-Carbon, High-Chromium Steels Due to Subzero Treatments. L. E. Gippert and G. M. Butler, Jr. *Transactions of American Society for Metals*, v. 39, 1947, p. 549-557; discussion, p. 558-568.

Three types of high-carbon, high-chromium die steels are shown to expand considerably when given a subzero treatment after hardening before tempering. Hardnesses of Rockwell C-67 to 68 are developed. Izod impact tests revealed no excessive brittleness when allowance was made for the increased hardness.

18-163. The Precipitation Heat Treatment of Workhardened 61S-W Aluminum Alloy Sheet. J. J. Warga. *Transactions of American Society for Metals*, v. 39, 1947, p. 680-689; discussion, p. 689-693.

The effects of prior workhardening upon the rate of aging of 61S aluminum-alloy sheet, and upon physical properties. It is concluded that the speed of reaction is increased measurably, but that no practical advantages are gained.

18-164. Carburized Cases of Hypoeutectoid Carbon Content. P. C. Rosenthal and G. K. Manning. *Transactions of American Society for Metals*, v. 39, 1947, p. 801-815; discussion, p. 815-819.

A method of restricting the maximum carbon content of carburized cases to the range of 0.80 to 0.40% carbon by adding silicon-bearing materials and a chloride to the carburizing compounds. The materials investigated were ferrosilicon, silicon carbide, calcium silicide, and silica, and chlorides of nickel, chromium, copper, calcium, and sodium. On the basis of weight per cent, ferrosilicon plus either nickel or chromium chloride was the most effective combination tried.

18-165. Carbide and Oxide in Surface Zones of Carburized Alloy Steels. Axel Hultgren and Erik Hagglund. *Transactions of American Society for Metals*, v. 39, 1947, p. 820-837; discussion, p. 837-842.

Results of carburizing tests for 50 hr. at 900° C. in charcoal-barium carbonate compound, in a mild carburizing compound, and in hydrocarbon gas, on a series of alloy steels. Theories regarding the formation of carbide and oxide zones in steels of certain alloy contents when carburized under certain defined conditions. 12 ref.

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Heat Treating (Cont.)

Hauck Mfg. Co., Inc. Booth 1002. Proportioning oil burners; oil and gas combination burners; regulating valves.

Hevi Duty Electric Co. Booth 135. Heat treating furnaces.

Holcroft & Co. Booth 1031. Heat treating equipment and supplies.

Holden Co., A. F. Booth 550. Salt baths and salt bath equipment; pot furnaces; electrode furnaces.

Hones, Inc., Charles A. Booth 720. Gas-fired oven furnaces; atmospheric burners; pot furnaces.

Houghton & Co., E. F. Booth 948. Heat treating salts, oils and compounds; water-soluble liquid carburizer.

Huppert Co., K. H. Booth 2731. Batch-type electric furnaces and ovens.

Illinois Testing Laboratories, Inc. Booth 920. Temperature, air and dew point measuring instruments.

Jensen Specialties, Inc. Booth 1806. Infrared ovens.

Kemp Mfg. Co., C. M. Booth 719. Industrial carburetion and combustion techniques; atmosphere generators; gas burners and control accessories.

Leeds & Northrup Co. Booth 1101. Temperature recorders and controllers; hardening, tempering and carburizing furnaces.

Lepel High Frequency Laboratories, Inc. Booth 929. High-frequency heating equipment.

Lindberg Engineering Co. Booth 726. Heat treating furnaces; laboratory furnaces; cylinders; valves; blowers; transformers.

Lindberg Steel Treating Co. Booth 1038. Heat treating services.

Lithium Co. Booth 715. Lithium atmosphere heat treating furnaces.

Michiana Products Corp. Booth 2720. Heat, corrosion and abrasion resistant alloy castings.

Miskella Infra-Red Co. Booth 2415. Infrared burning and baking units.

National Research Corp. Booth 2018. High vacuum equipment.

Ohio Crankshaft Co. Booth 644. Tocco induction heating machines.

Ohio Steel Foundry Co. Booth 151. Heat and corrosion resistant castings.

Park Chemical Co. Booth 634. Heat treating materials.

Partlow Corp. Booth 714. Industrial controls; thermostats; gas burners; timers.

Pyrometer Instrument Co. Booth 422. Optical, radiation, immersion, surface, indicating, bi-optical and micro-optical pyrometers.

RCA Victor Div., Radio Corp of America. Booth 2714. Radio frequency heating units.

Rogers & Co., G. S. Booth 1514. Heat treating materials; carburizers and carburizing salt.

Salkover Metal Processing. Booth 126. Induction hardening, copper brazing.

Scientific Electric Division, "S" Corrugated Quenched Gap Co. Booth 518. Induction and dielectric heaters; insulators.

Scott & Son, Inc., C. U. Booth 911. Industrial heat treating.

Selas Corp. of America. Booth 818. Heat treating and forging furnaces; special combustion equipment; burners; gas-air premixing.

Sellers Engineering Co. Booth 614. Gas burners and heaters.

Sentry Co. Booth 543. High speed steel hardening furnaces; high-temperature tube combustion furnaces.

Spencer Thermostat Co. Booth 1817. Temperature controls.

Spencer Turbine Co. Booth 854. Vacuum cleaning equipment; turbo-compressors.

Stuart Oil Co., D. A. Booth 406. Oils.

Sunbeam Corp. Booth 916. Industrial heat treating furnaces—recirculating type; electric box furnace; gas oven; furnace lighter.

Surface Combustion Corp. Booth 617. Prepared atmosphere furnaces; dew point recorder; burner equipment.

Taco-West Corp. Booth 1234. Automatic control equipment.

Upton Electric Furnace Div. Booth 536. Heat treating furnaces.

War Assets Administration. Booth 1249. Surplus property—samples and literature.

Weltronic Co. Booth 2915. Electronic induction heaters.

Westinghouse Electric Corp. Booth 253. Heat treating furnaces.

Wheelco Instruments Co. Booth 515. Indicating pyrometer controllers; recorders; combustion safeguard; operation recorder.

Metalworking Equipment, Supplies and Accessories

Acme Mfg. Co. Booth 2423. Automatic and semi-automatic grinding, polishing and deburring machines.

Acme Steel Co. Booth 2424. Metal stitchers.

Acme Tool Co. Booth 115. Surface plates; lapping plates; straight edges; toolholders; bench vises.

Ajax Electric Co., Inc. Booth 1054. Salt bath furnaces for forging.

18-166. Influence of Water Vapor and Methane on the Heat Treatment of Steel in a CO:H$_2$ Gas Atmosphere. Henry M. Heyn. *Metal Progress*, v. 52, Aug. 1947, p. 232-237.

Summarizes address, "Controlled Atmospheres and their Practical Application," given at Western Metal Congress and elaborates on those portions which described the utility of a cracked gas-air mixture containing about 20% CO, 40% H_2, 40% N_2 and controlled amounts of water vapor and methane.

18-167. Classification of Prepared Atmospheres. C. C. Eeles and M. E. Shriner. *Metal Progress*, v. 52, Aug. 1947, p. 256-B.

Classes, method of preparation, analysis, air-gas ratio, dew point, cost, and nature of atmosphere. (From American Gas Assoc., Industrial and Commercial Gas Section, Information Letter No. 9.)

18-168. Tempering Toolsteels. (Concluded.) George A. Roberts. *Steel*, v. 121, Aug. 4, 1947, p. 96-98, 100.

Tempering characteristics of three cold working and two hot working, highly alloyed die steels.

18-169. An Investigation of Tempered Chromium-Silicon Spring Steel. H. J. Elmendorf. *American Society for Metals Preprint No. 1*, 1947, 18 p. (To be published in *Transactions* for 1948.)

The tension stress-strain curves for stress relieved, "blued", chromium-silicon spring wires show marked changes in shape as a function of the bluing temperature, and these changes are found to be associated with hardness of the tempered wire, and with mechanical properties of the blued spring wires. Results indicate that chromium-silicon steel is superior to S.A.E. 6150 under the conditions studied.

18-170. Tempering Effects and the Mechanical Equation of State. J. C. Fisher and C. W. MacGregor. *American Society for Metals Preprint No. 3*, 1947, 11 p. (To be published in *Transactions* for 1948.)

The concept of a mechanical equation of state is extended to include materials being tempered. A composite variable including the combined effects of temperature and time is introduced. Tension tests of the true stress-strain type are used to show the effects of tempering on true stress-strain properties. It is shown that tempering is independent of strain, indicating that, in the absence of recrystallization and similar phenomena, the stress reaction in tempered martensite depends only on instantaneous values of temperature, strain, strain rate, and tempering parameter.

18-171. The Induction Hardening of a Quality Controlled Cast Iron. C. F. Walton and H. B. Osborn, Jr. *American Society for Metals Preprint No. 4*, 1947. (To be published in *Transactions* for 1948.)

The ready response of the material studied to the short heating cycles inherent in induction heating makes it especially well suited to this type of treatment. Also upon induction hardening, this material develops unusually high wear resistance without loss of strength.

18-172. Some Factors Affecting the Induction Hardening of an Alloy Cast Iron. J. R. Sloan and R. H. Hays. *American Society for Metals Preprint No. 5*, 1947, 34 p. (To be published in *Transactions* for 1948.)

In induction hardening of gray cast-iron cylinder liners, utilizing frequencies of 3000 and 9600 cycles per sec., certain unusual results were encountered. The higher frequency resulted in increased surface temperatures, which caused some absorption of segregated alloys and resolution of graphite. This caused increased retention of austenite and decreased surface hardness; also certain low-melting constituents were melted. Conclusions are verified by micrographic methods, subzero cooling, microhardness tests, and by chemical and X-ray analyses.

18-173. A Study of the Metallurgical Characteristics of Three Induction Hardened Steels Heated at Various Rates. James W. Poynter. *American Society for Metals Preprint No. 6*, 1947. (To be published in *Transactions* for 1948.)

Specimens of S.A.E. 1045, 1.06% C drill rod, and S.A.E. 4340 steels in the pearlitic, normalized, and spheroidized conditions were induction heated at various rates to a temperature slightly above the critical, and to 1040° C. Microhardness determinations and metallographic examinations were made on the hardened zone.

18-174. The Dimensional Stability of Steel. Part II. Further Experiments on Subatmospheric Transformations. S. G. Fletcher, B. L. Averbach and M. Cohen. *American Society for Metals Preprint No. 7*, 1947. (To be published in *Transactions* for 1948.)

The transformation of retained austenite by subzero cooling was investigated in three typical toolsteels, and the stabilization of this austenite toward subzero transformation was studied as a function of austenitizing and tempering treatments. The retained austenite can be transformed by immediate refrigeration after quenching only if its amount is low. However, almost complete stabilization may be obtained by tempering prior to subcooling. Activation energies were obtained for the effect of tempering on the contraction of martensite and on the stabilization of austenite. These indicate that stabilization is not controlled by the martensite contraction.

18-175. The Heat Treatment and Properties of Some Beryllium-Nickel Alloys. W. Lee Williams. *American Society for Metals Preprint No. 11*, 1947, 13 p. (To be published in *Transactions* for 1948.)

Effects of time and temperature on the precipitation hardness of a 2.07% beryllium-nickel alloy of commercial purity. Information gained served as a basis for the heat treatment of a cold-rolled 13/16-in. bar containing 1.62% beryllium. Specimens of this material were tested in the full-hard condition for tensile and impact properties, corrosion resistance in salt water, and fatigue strength in air, and under the simultaneous influence of cyclic stress and corrosion.

18-176. The Effect of Homogenization in Cast Steels. R. J. Marcotte and C. T. Eddy. *American Society for Metals Preprint No. 30*, 1947. (To be published in *Transactions* for 1948.)

Hardenability, impact properties, and the time-temperature transformation curves for certain selected cast steels were studied using test bars cut from keel block coupons. The effects attributable solely to homogenization are negligible.

18-177. Heat Treatment of Welded Constructions in Mild Steel. *Transactions of the Institute of Welding B.W.R.A. Supplement*, v. 10, June 1947, p. 3-5.

Recommendations prepared by the British FE.14 Committee.

18-178. Isothermal Heat Treatment of Steel Ball Bearing Races. Harold A. Knight. *Materials & Methods*, v. 26, Aug. 1947, p. 86-87.

A preliminary grinding operation is dispensed with.

18-179. Practical Aspects of Surface Hardening Methods. H. E. Boyer. *Iron Age*, v. 160, Aug. 14, 1947, p. 74-79.

The possibilities and limitations of pack carburizing, liquid carburizing, gas carburizing, and nitriding. Each method is intended for a definite role in the surface hardening of steel parts. Details of pack and liquid carburizing. (To be continued.)

18-180. Minimizing Die-Block Distortion Resulting From Hardening. *Iron Age*, v. 160, Aug. 14, 1947, p. 79.

Hardening of large die blocks having an impression machined out to form a half-round and also having a hole running perpendicular to this surface. To minimize distortion, hardened 3-in. round bars are inserted in each end of the die during cooling from 1000 to 500° F.

18-181. Long Pieces Can Be Induction Hardened Progressively. *American Machinist*, v. 91, Aug. 14, 1947, p. 102-104.

Lengthy pieces are fed first through specially designed induction coils, then through a spray quench.

Section 18. For additional annotations indexed in other sections, see: 2-153; 3-197-199-211-230-255; 4-95-100-101-103-107; 7-311-319; 9-96; 11-125; 16-91-93-95-96-97-100-104-106; 19-258-268; 25-116.

19 WORKING — Rolling, Drawing, Forging

19-234. Shot-Peening of Springs. L. J. Wieschhaus. *Metal Progress*, v. 52, July 1947, p. 103.

Examples of variations in shot-peening results as a reply to some comments by Alberto Oreffice, in a letter in the Oct. 1946 issue. Clarifying letter from Dr. Oreffice.

19-235. Forging Anvil Resurfaced by Ingenious Setup. *Iron Age*, v. 160, July 17, 1947, p. 48.

Method used for resurfacing of a badly dented, roughened, and work hardened 69-ton steel-forging anvil without removing it from the hammer.

19-236. Hot Heading and Cold Forming Bars in Single Operation. *Iron Age*, v. 160, July 17, 1947, p. 60.

Production setup enables an operator to simultaneously produce a circular flange, a square head, and a 1-in. flat on ¼-in. round spreader bars, at the rate of 30 pieces a min., in forming concrete reinforcing bars.

19-237. Die-Grams. Karl L. Bues. *Western Machinery and Steel World*, v. 38, July 1947, p. 117-118.

Definitions of terms used by the tool engineer in connection with stamping operations. (To be continued.)

19-238. Skin Stretching. *Aircraft Production*, v. 9, July 1947, p. 243-248.

British developments in forming large airframe panels.

19-239. Details of a New 18-Inch Reversing Cold Steckel Mill. L. W. Law. *Sheet Metal Industries*, v. 24, July 1947, p. 1349-1351, 1365.

Recently installed in Britain, the mill is specially designed for the production of "Crystalloy" which is a cold reduced 3% Si electrical steel with low loss and high permeability, highly oriented in the direction of rolling.

19-240. The Rolling of Metals; Theory and Experiment. Part XIV. Methods Used in Practice for the Calculation of Rolling Load and Horsepower. (Continued.) L. R. Underwood. *Sheet Metal Industries*, v. 24, July 1947, p. 1352-1360, 1366.

Methods previously described are

(Turn to page 46)

Metalworking (Cont.)

Allison Co. Booth 1110. Abrasive cutting wheels.

Alox Corp. Booth 141. Special lubricants and oil additives for metal cutting, drawing and rolling.

Ameraco Industrial Specialties. Booth 2425. Drill sharpeners; mallets.

American Buff Co. Booth 1425. Buffs; buffing and polishing wheels.

Braeburn Alloy Steel Corp. Booth 1032. Toolsteel products; shear knives.

Campbell Division, Andrew C., American Chain & Cable Co. Booth 1110. Abrasive cutting machines; nibbling machines.

Carboloy Co., Inc. Booth 1142. Cemented carbide wear resistant parts and tools.

Chayes Dental Instrument Corp. Booth 2416. Abrasive mounted points for weld grinding, die setting, mold making.

Cincinnati Milling and Grinding Machines, Inc. Booth 2702. Machine tools.

Cities Service Oil Corp. Booth 230. Cutting and grinding oils; drawing compounds; greases.

Cleveland Crane & Engineering Co. Booth 1210. Bending press; pivoted-blade shear.

Clinton Machine Co., Inc. Booth 2725. Thomas Metal Master for nine metal-working operations.

Continental Industrial Engineers, Inc. Booth 521. Special machines; industrial furnaces; process lines; complete plants.

Dearborn Industrial Mfg. Co. Booth 2005. Buffing and polishing wheels and equipment; buffing compounds.

Delaware Tool Steel Corp. Booth 1026. Tool products.

Diamond Machine Tool Co. Booth 225. Punch presses; milling machines, attachments and accessories.

DoAll Midwest Co. Booth 2315. Contour sawing and filing machine; hydraulic surface grinder; toolmakers precision lathe; variable speed pulleys; tool grinder.

Dreis & Krump Mfg. Co. Booth 1246. Sheet and plate metalworking machinery—press and bending brakes.

Electro Refractories & Alloys Corp. Booth 240. Resinoid grinding wheels.

Fansteel Metallurgical Corp. Booth 2115. Tantalum-tungsten carbide tipped tools and dies.

Gaertner Scientific Corp. Booth 1517. Toolmaker microscopes; automatic circular dividing machine.

Gray Machine Co. Booth 1814. Cutting and nibbling machinery.

Grobet File Co. of America, Inc. Booth 2724. Files; burring tools; rifflers; machine files; needle files; gravers; burnishing tools.

H & H Research Co. Booth 115. Reciprocating action tools and accessories; mallets.

Hammond Machinery Builders. Booth 142. Polishing and buffing machines; polishing lathes; abrasive belt machines; abrasive belt backstands; tool grinders.

Honan-Crane Corp. Booth 2331. Sludge removal conveyer; clarifier for coolants; sump cleaner; oil purifier.

Houghton & Co., E. F. Booth 948. Cutting oils and drawing compounds.

Hydraulic Press Mfg. Co. Booth 522. Hydraulic equipment; die-casting machines.

Jackson Buff Corp. Booth 1928. Buffing wheels.

Kennametal, Inc. Booth 2613. Tools; tips; mills; cutters; drill bits; files.

Knu-Vise, Inc. Booth 2015. Toggle-action clamps and pliers for jigs and fixtures; C-clamps; vise wrenches.

Kux Machine Co. Booth 1209. Die-casting machines; powder metal press.

Mall Tool Co. Booth 1238. Flexible shaft equipment; portable power tools.

Manderscheid Co. Booth 146. Polishing lathes and accessories; backstand idler.

Manhattan Rubber Mfg. Division. Booth 1215. Abrasive cut-off wheels.

Martindale Electric Co. Booth 1516. Rotary burs and files; saws; screw slotting and metal slitting.

illustrated by another example. Methods used in the examples. (To be continued.)

19-241. Practical Problems of Light Presswork Production. (Continued.) J. A. Grainger. *Sheet Metal Industries*, v. 24, July 1947, p. 1369-1376.

Setting the feed mechanism; blank and draw tools with hand feed and mechanical feed; compound tools; follow-on tools in roll-feed presses; setting procedure; final adjustments; assembling the blankholder; earing; and subsequent draw setting. (To be continued.)

19-242. The Production of Pressed Steel Ogee Gutters; A Solution to a Practical Problem. *Sheet Metal Industries*, v. 24, July 1947, p. 1417-1418, 1420.

How the gutter section of 4½ and 5-in. gutters was formed in one operation.

19-243. Impact Extrusion. *Machinery (London)*, v. 71, July 3, 1947, p. 3-11.

Application of the process to the production of radio-condenser components.

19-244. Piercing Two Holes in Alignment. *Machinery (London)*, v. 71, July 3, 1947, p. 13.

Simple but unusual press tool for the above.

19-245. Shaping and Forming. Willibald Trinks. *American Iron and Steel Institute Preprint*, 1947, 24 p.

Application of the principles of plastic deformation to various metalworking processes.

19-246. Most Modern Manufacturing Method of Wrought Steel Wheels. *Engineering Materials*, v. 5, June 1947, p. 62-67.

Techniques used by American Rolling Mill Co.

19-247. High Production Lamination Tooling. *Western Machinery and Steel World*, v. 38, July 1947, p. 104-105.

Design and production of transformer, rotor, and stator laminations, and the tooling for stamping them.

19-248. Sheet and Tinplate Mills. J. H. Mort. *Iron and Steel*, v. 20, July 1947, p. 351-356.

Methods used to reface the rolls used. Properties of various alloys used; the importance of neck cooling; influence of width; rolling narrow sheet on wide rolls; measurement of roll temperatures; and shapes of roll ends. Simple mathematics is applied to the calculation of proper curves for the roll surfaces. (To be continued.)

19-249. Press Forging at Chevrolet Plant, Muncie, Ind. P. D. Aird. *Modern Industrial "Press"*, v. 9, July 1947, p. 13-14, 18, 22.

Methods and equipment for production of 21 different auto parts.

19-250. Modern Press Equipment Speeds Production of Butler Boulevard Home. Gerald E. Stedman. *Modern Industrial "Press"*, v. 9, July 1947, p. 24, 26, 28.

Methods and equipment for production of steel prefabricated houses.

19-251. Manufacturing Wire. *Western Metals*, v. 5, July 1947, p. 20-21.

Production of wire and mesh at the Bay area plants of the California Wire Cloth Corp.

19-252. Hole Piercing and Stamping in One Operation. Ernest C. Morse. *Materials & Methods*, v. 26, July 1947, p. 80-84.

Numerous applications of piercing of holes with diameters less than the thickness of the blank, or with tolerances under 0.001 in., and piercing holes at the same time as blanking, and before forming.

19-253. Working Magnesium. James V. Winkler. *Western Metals*, v. 5, July 1947, p. 35-37.

Various tooling methods and current techniques used in forming magnesium products.

19-254. Press Shop Operations in Bicycle Production. *Machinery (London)*, v. 71, July 10, 1947, p. 31-38.

Methods and equipment used at Raleigh Cycle Co., Nottingham, England.

19-255. A Mechanized Forge. *Engineer*, v. 184, July 11, 1947, p. 31-33.

Equipment and procedures at forging shop of Daniel Doncaster and Sons, Ltd., Sheffield, England.

19-256. Auxiliary Stripper Prevents Punch Breakage. *American Machinist*, v. 91, July 31, 1947, p. 77.

A recent job required punching a 0.0236-in. hole in 0.0313 sheetmetal stock, at a distance of 0.0272 in. from the edge. Piercing was a complete failure because a punch was broken at every stroke of the press no matter how carefully the press was operated. How an auxiliary stripper solved the problem.

19-257. 14-Station Die Makes Tip Clutches for Pencils. Gordon Murphy. *American Machinist*, v. 91, July 31, 1947, p. 104-105.

Feed and air-ejection equipment are incorporated in progressive setup to provide 3-jaw clutch from strip for Eversharp pencils.

19-258. Copper-Manganese Alloys: The Properties of Cold Worked and Annealed Alloys Containing 2 to 20% Manganese. R. S. Dean, J. R. Long, T. R. Graham, and D. P. Sugden. *Transactions of American Society for Metals*, v. 38, 1947, p. 577-591; discussion, p. 591-592.

Influence of cold working and subsequent annealing of 60% cold worked material. 12 ref.

19-259. Calculation of Press Forging Pressures and Application to Magnesium Forgings. R. L. Dietrich and G. Ansel. *Transactions of American Society for Metals*, v. 38, 1947, p. 709-727; discussion, p. 727-728.

The pressures required for forging are a function of size, shape, friction, and deformation resistance of the metal. Equations are derived for calculating the forging pressures in simple sections as a function of these variables. The data thus obtained are used to calculate the loads required for upsetting or for fairly simple die forgings. Some data for two commercial magnesium forging alloys.

19-260. Folding in the Cupping Operation. William M. Baldwin, Jr., and Thomas S. Howald. *Transactions of American Society for Metals*, v. 38, 1947, p. 757-788.

Theoretical and experimental investigation of the tendency of a blank to fold when drawn into a cup. Copper, brass, aluminum in a hard and soft temper and S.A.E. 1008 steel in a soft temper were investigated. The effect of various die contours, reductions in diameter from blank to cup, and a wide range of blank thicknesses was studied. It was found possible, by purely theoretical means, to predict the tendency of a blank to fold from the stress-strain diagram. 24 ref.

19-261. Richard Johnson and Nephews' Developments. *Wire Industry*, v. 14, July 1947, p. 385, 387.

British continuous rod mill.

19-262. Samuel Fox & Co.'s Strip and Wire Plant. *Wire Industry*, v. 14, July 1947, p. 387.

New equipment modernizes plant.

19-263. Form Tools. W. F. Walker. *Edgar Allen News*, v. 26, July 1947, p. 870-871.

Circular form tools. (To be continued.)

19-264. Extruded Aluminum Freezer Compartment. *Product Engineering*, v. 18, Aug. 1947, p. 104.

In new Servel gas refrigerator, aluminum fins are formed around the freezer coils by a simple press operation.

19-265. Uses of Shot-Peening Other Than for Fatigue Durability. L. J. Wieschhaus. *Product Engineering*, v. 18, Aug. 1947, p. 122-127.

New applications of shot-peening and resistance of materials to stress-corrosion cracking.

19-266. Severe Bending of 75S-T Spar Caps. P. F. Girard. *Automotive Industries*, v. 97, Aug. 1, 1947, p. 44, 74, 86.

Setup developed at Ryan Aeronautical Corp.

19-267. Bending for Dihedral and Sweepback Simplified on Heavy 75S-T Spar Caps. *Aviation Week*, v. 47, Aug. 4, 1947, p. 18.

Combination heating-and-bending process developed at Ryan solves difficult production problem of forming large cross-section critical members.

19-268. Precipitation in a Magnesium Sheet. C. T. Haller and C. S. Barrett. *Transactions of American Society for Metals*, v. 39, 1947, p. 670-676; discussion, p. 676-679.

The effect of the nature of cold work on the distribution of the precipitate in a commercial magnesium sheet. X-ray and metallographic investigations were combined in a study of the metallography of aging in a 6% Al, 1% Zn magnesium-base alloy.

19-269. The Cold Workhardening Properties of Stainless Steel in Compression. F. K. Bloom, G. N. Goller, and P. G. Mabus. *Transactions of American Society for Metals*, v. 39, 1947, p. 843-864; discussion, p. 864-867.

The cold workhardening properties of a large number of chromium-nickel and plain-chromium stainless steels were studied by a special compression test. Effects of changes in content of chromium and nickel; of carbon and of nitrogen; of admixtures of Cb, Ti, and Mo; and of heat treatment and cold working temperature variations.

19-270. The Effect of Speed of Rolling in the Cold Rolling Process. H. Ford. *Journal of the Iron and Steel Institute*, v. 156, July 1947, p. 380-398.

The effects and possible causes.

19-271. Production Processes. Part XXVI. Thread and Form Rolling. Roger W. Bolz. *Machine Design*, v. 19, Aug. 1947, p. 145-150.

Screw threads and other circular forms may be cold rolled between flat or cylindrical dies with fast production, good finish and hardening.

19-272. Tube Straightening. E. W. Wrage. *Mechanical Engineering*, v. 69, Aug. 1947, p. 648-650.

Conventional methods for straightening welded and seamless tube stock.

19-273. Stretching Characteristics of Aluminum Alloy Sheet. J. M. Taub. *American Society for Metals Preprint No. 12*, 1947. (To be published in *Transactions* for 1948.)

A number of factors which influence the stretching of aluminum-alloy sheet during press-punch operations. Most of the experimental work was conducted with a single-contoured punch. A few results using a double-contoured punch indicate that parts having a relatively shallow curvature in two directions are affected by variations in processing conditions similar to singly curved parts.

19-274. Recrystallization as a Measurement of Relative Shot-Peening Intensities. K. B. Valentine. *American Society for Metals Preprint No. 24*, 1947, 7 p. (To be published in *Transactions* for 1948.)

The phenomena of recrystallization and grain growth of a critically strained, low-carbon steel at subcritical temperature were used as a means of determining the depth of penetration of cold work induced by shot-peening. Depth of penetration is increased by increase of shot size, shot velocity, and time of peening.

19-275. The Aetna Wire Drawing Unit. Part I. E. J. P. Fisher and A. L. Thurman. *Wire and Wire Products*, v. 22, Aug. 1947, p. 582-583, 586-587.

Development, construction, and op-

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Metalworking (Cont.)

Miller Motor Co. Booth 2740. Air cylinders; hydraulic cylinders; booster; accumulator; counterbalance cylinder.

Mine Safety Appliances Co. Booth 1616. Power tools—portable punch; cable splicer; stud driver; special tools.

Nelson Sales Corp. Booth 322. Stud welders and flux-loaded studs.

Parker-Kalon Corp. Booth 2404. Self-tapping screws; socket set screws; socket head cap screws.

Peterson Welding Laboratories. Booth 1818. Surface grinders.

Pines Engineering Co., Inc. Booth 306. Hydraulic bending machine; profiling machine.

Porter-Cable Machine Co. Booth 1325. Wet and dry abrasive belt grinders.

Porter-McLeod Machine Tool Co., Inc. Booth 1717. Polishing machine; wet abrasive cutting-off machine.

Richards Co., J. A. Booth A-1811. Multiform bender-cutter for fabricating irregular-shaped parts.

Shell Oil Co., Inc. Booth 1716. Cutting oils; drawing compounds; industrial greases.

Simonds Saw & Steel Co. Booth 2223. Band and circular saws; machine knives; circular cutters; shear blades; hack saw blades; files.

Socony-Vacuum Oil Co., Inc. Booth 1518. Cutting oils and greases.

South Bend Lathe Works. Booth 1025. Precision lathes.

Specialty Equipment & Machinery Corp. Booth 206. Tangent benders.

Standard Electrical Tool Co. Booth 1914. Hand grinders; bench and pedestal grinders; buffing and polishing machines; electric drills.

Strand & Co., N. A. Booth 2323. Flexible shaft machines and attachments for grinding, polishing, buffing, sanding, drilling, reaming.

Stuart Oil Co., D. A. Booth 416. Cutting, grinding and other metalworking oils.

Stutson Associates, Willis. Booth A-1817. Taps, gages and counterbores; toolholders and knurls; turning tools; collets and pushers; boring bars and holders; automatic roll feeds; tool bits.

Texas Co. Booth 2215. Cutting coolants and lubricants; hydraulic oils of rust and oxidation inhibitor type.

Tide Water Associated Oil Co. Booth 2535. Cutting oils; industrial oils and lubricants.

Torit Mfg. Co. Booth 2316. Dust collecting equipment for grinding and polishing operations.

Universal-Cyclops Steel Corp. Booth 430. Reception space.

Vapor Blast Mfg. Co. Booth A-1814. Liquid honing cabinets and supplies.

War Assets Administration. Booth 1249. Surplus property—samples and literature.

Wells Mfg. Corp. Booth 2204. Horizontal metal-cutting band saw machines.

Whistler & Sons, Inc., S. B. Booth 301. Piercing and notching units; perforating equipment.

Yoder Co. Booth 1241. Electric resistance weld tube mill.

Cleaning, Finishing and Plating Equipment and Supplies

Acme Mfg. Co. Booth 2423. Automatic and semi-automatic grinding, polishing, buffing and deburring machines.

Ajax Electric Co., Inc. Booth 1054. Salt bath furnaces for descaling and cleaning.

Alox Corp. Booth 141. Rust preventives, both oil and water soluble.

Alvey-Ferguson Co. Booth 1037. Small standard washing machine.

American Buff Co. Booth 1425. Buffs; buffing and polishing wheels.

American Wheelabrator & Equipment Corp. Booth 910. Blast cleaning and shot-peening equipment; dust collectors.

Blakeslee & Co., G. S. Booth 1338. Solvent degreasers; metal parts washer.

Burdett Mfg. Co. Booth 1426. Paint drying oven with infrared gas-fired combustion system.

Cities Service Oil Corp. Booth 230. Solvents; rust removers; anticorrosive preparations.

Continental Industrial Engineers, Inc. Booth 521. Special machines; process lines.

Crown Rheostat & Supply Co. Booth 224. Bright finishing machine; centrifugal dryer; rheostats; switches; conveyers; plating barrels.

Dearborn Industrial Mfg. Co. Booth 2005. Buffing and polishing wheels and equipment; buffing compounds.

Despatch Oven Co. Booth 1921. Ovens for baking finishes; driers.

Detrex Corp. Booth 2216. Degreaser; metal parts washers; degreasing solvents; emulsion cleaners.

Diversey Corp. Booth 221. Metal cleaners and surface preparation products.

Division Lead Co. Booth A-2635. Lead anodes.

Globe Imperial Corp. Booth 2110. Plastic coating for tools and metal protection.

Green Electric Co., W. Booth 349. Platers' and polishers' supplies; rectifiers.

Grobet File Co. of America, Inc. Booth 2724. Gravers; burnishing tools; files.

eration of continuous nonslip wire-drawing machine. (To be continued.)

19-276. Drawing Die Problems and Formulas. Part V. The Techniques of Drawing. James Walker. *Tool Engineer*, v. 19, Aug. 1947, p. 31-35.
Advanced design and construction of simple and compound drawing dies for mass production industry.

19-277. Proposed Standard Sheet for Press Forging Dies. John R. Parks. *Tool Engineer*, v. 19, Aug. 1947, p. 43-44.
How proper clearances and fine surface finish add to die life.

19-278. The Single Slot Punch and Die in the Electrical Industry. J. H. Quatkemeyer. *Tool & Die Journal*, v. 13, Aug. 1947, p. 50-52.
Application of the single slot punch and die to the manufacture of electric motors used in experimental and special projects, or to fill relatively small orders for such equipment.

19-279. Producing Automotive Valves by Extrusion. Charles H. Wick. *Machinery*, v. 53, Aug. 1947, p. 142-146.
How inlet and exhaust valves for automobile and truck engines are extruded from hot slugs of steel at the Chevrolet-Flint Mfg. Div. of General Motors Corp.

19-280. Carbide Dies Cut Laminations. Rupert Le Grand. *American Machinist*, v. 91, Aug. 14, 1947, p. 96-100.
Use in the stamping of laminated sheet parts for stators and meters.

Section 19. For additional annotations indexed in other sections, see: 3-212-213-216-227-230; 4-91; 7-307-319; 9-84; 12-149; 18-145-168; 20-430-471; 21-76; 23-254-274-275; 24-243-246-248; 27-165.

20 MACHINING AND MACHINE TOOLS

20-399. Grinding. Guy Hubbard. *Steel*, v. 121, July 14, 1947, p. 81-82, 116.
History of precision grinding. Development of coolants. Advances in hole grinding.

20-400. How to Use Carbide Cutters for Milling; A Practical Conversion Problem. H. A. Frommelt. *Iron Age*, v. 160, July 17, 1947, p. 61-64.
Problems in conversion of a large motor frame to carbide milling; the factors involved in milling the clearance under the axle pads, cutting narrow slots, and facing window openings. Production figures show large increases.

20-401. Friction-Cutting Techniques. H. J. Chamberland. *Aero Digest*, v. 55, July 1947, p. 46-47, 94.
Methods used and applicability to various metals and alloys. Saw velocities and saw pitches for the materials best suited to the process.

20-402. Broaching. Guy Hubbard. *Steel*, v. 121, July 21, 1947, p. 96-98, 128.
Chief developments in 100 years of broaching. Importance in the development of modern machine tools.

20-403. Two Jig Boring Machines. *Engineer*, v. 184, July 4, 1947, p. 15-16.
Two new Swiss machine tools.

20-404. How to Use Carbide Cutters for Milling. H. A. Frommelt. *Iron Age*, v. 160, July 24, 1947, p. 68-70.
Twentieth and final section consists of a brief resume of all the data given in detail in the preceding articles.

20-405. Automatic Repetition Work and the Manufacture of Precision Apparatus. André Daetwyler. *Microtecnic (English Section)*, v. 1, Feb. 1947, p. 14-15.
A general article, prepared as an introduction to a series of articles on automatic lathe work. (Translated from the French.)

20-406. Le Tournage des Alliages Legers. (Machining of Light Alloys.) Rene Schweyckart. *Revue de l'Aluminium*, v. 24, Feb. 1947, p. 44-51.
The importance of high cutting speeds. Techniques for the different types of aluminum alloys. Chips and surfaces produced by different techniques.

20-407. Production Processes. Their Influence on Design. Part XXV. Precision Boring. Roger W. Bolz. *Machine Design*, v. 19, July 1947, p. 137-142.
Need for exact boring. Uses of bored pieces in modern machinery. How close tolerances are obtained.

20-408. Drilling and Boring Tools. Part 12. *Tool Engineer*, v. 18, July 1947, p. 47-48.
Design of a fixture for an engine or turret lathe for production of a specific job requiring close tolerance boring. (Concluded.)

20-409. Profile Turning Production of Small Repetition Parts by "Skiving". N. Cooke. *Aircraft Production*, v. 9, July 1947, p. 249-251.
A shaving method—termed "skiving" by wood-turners—which has been used with success in the production of aircraft turnbuckles.

20-410. Aircraft Brake Production. J. A. Oates. *Aircraft Production*, v. 9, July 1947, p. 270-274.
Specialized equipment for multiple drilling and slotting used by British firm.

20-411. Precision Boring. *Aircraft Production*, v. 9, July 1947, p. 275-276.
Accurate hole-location by triangulating device and gage slips.

20-412. V-Block for Odd-Shaped Punches. *Machinery (London)*, v. 71, July 3, 1947, p. 11.
Diagram and description for use when grinding.

20-413. Berthiez-C. W. B. Boring and Milling Machine. *Machinery (London)*, v. 71, July 3, 1947, p. 14-17.
Swiss produced machine suitable for boring, surfacing, horizontal and vertical milling, drilling, tapping, grinding, profile copying, and in-line boring at one setting of the workpiece.

20-414. The New Engraving Machine "M.S.A.". R. P. Guye. *Microtecnic (English Section)*, v. 1, June 1947, p. 66-68.
Machine for marking tools and apparatus utilizing a pantograph. Either acid or an electric arc may be used. (Translated from the French. For illustrations, see *French Section*, p. 156-159.)

20-415. Improved Cold Set Sintered Carbide Tool. *Industrial Diamond Review*, v. 7, June 1947, p. 165.
A new type of sintered carbide tool for which several advantages are claimed.

20-416. New Oerlikon Carbide Grinder. *Industrial Diamond Review*, v. 7, June 1947, p. 175.
Hand-operated universal carbide grinder for the watch and precision industries which can be used with advantage on small tools and components, for precision grinding and polishing operations, such as cylindrical grinding, relief grinding, grinding chip breaker grooves, surface grinding, and sawing.

20-417. Report on the German Machine Tool Industry. *Industrial Diamond Review*, v. 7, June 1947, p. 178-180.
(Reprinted from B.I.O.S. Final Report, No. 641, Item No. 31.)

20-418. Moore Panto-Crush Wheel Truer. *Industrial Diamond Review*, v. 7, June 1947, p. 184.
Machine attachment which combines diamond form wheel truing by pantograph and by roll crushing.

20-419. What Is the Meaning of Generating Milling? Ernest Widmer. *Microtecnic (English Section)*, v. 1, June 1947, p. 65-66.
The manufacture of toothed wheels by this method. (Translated from the German. For illustrations, see *French Section*, p. 152-155.)

20-420. A New Line of New Britain Automatics. *Screw Machine Engineering*, v. 8, July 1947, p. 56-61.
Descriptive.

20-421. Designing Tools for Screw Machine Production. Part XI. Roy M. Spaulding. *Screw Machine Engineering*, v. 8, July 1947, p. 62-63, 65, 67.
Recommended degrees of top rake for a wide variety of materials. How to calculate top rake for form tools only and for a combination of cutoff and form tools.

20-422. Highlights on Threading. Part II. H. F. Wieler and R. E. Bender. *Screw Machine Engineering*, v. 8, July 1947, p. 69-72.
A diagram of thread throat; how to grind the cutting face of a chaser, and the gun-tap grind. Design of insert chaser carriers. (To be continued.)

20-423. Stock Ends. *Screw Machine Engineering*, v. 8, July 1947, p. 75.
Burring gear teeth, by Robert M. Stone. Turret loaders, by Raymond J. Braski.

20-424. A Quick Acting Drill Jig. Robert Mawson. *Materials & Methods*, v. 26, July 1947, p. 134.
Has accuracy, simplicity and quick action.

20-425. Three Methods of Tooling One Part. *Screw Machine Engineering*, v. 8, July 1947, p. 44-49.
The actual steps followed in eliminating trouble and devising superior methods for production of a specific clock part. The first two methods described produced a cut thread on the part and were quite satisfactory. However, the third method, using roll threading, is definitely superior to the other two.

20-426. Broaching Brasses and Bronzes. Harry H. Gotberg. *Western Machinery and Steel World*, v. 38, July 1947, p. 93-95.
Principles of design and operation.

20-427. Precision Tripods. *Western Machinery and Steel World*, v. 38, July 1947, p. 98-99.
Production of above at DeYoung Bros. Machine Shop in Los Angeles.

20-428. Temperature Control for Prototype Work. *Western Machinery and Steel World*, v. 38, July 1947, p. 102-103, 119.
Use of controlled temperature room for jig boring and duplicating in order to provide precision to 0.0002 in.

20-429. Millions of Parts a Month. Louis Zila. *Western Machinery and Steel World*, v. 38, July 1947, p. 106-108.
Production of miscellaneous tiny parts used in calculating machines.

20-430. Carboloy Tools Solve Problem of Resurfacing Workhardened Forging Anvil. *Modern Industrial "Press"*, v. 9, July 1947, p. 46.
Resurfaced without removal from hammer.

20-431. Fine Finish by Burnishing. *Screw Machine Engineering*, v. 8, July 1947, p. 38-39, 41.
By application of roller burnishing, many jobs which formerly required secondary operations in order to meet finish specifications can be completed on the automatic screw machine. The use of high-speed drilling attachments, cross-hole drilling, and chamfering the cut-off end of a part.

20-432. Optical Drill Chuck. *Engineering*, v. 164, July 4, 1947, p. 8.
Drill chuck manufactured in Britain which has an optical system for exact location of the drill over the scribed cross marks at which the hole is to be drilled. Accuracy within 0.002 in. is claimed.

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Finishing (Cont.)

Houghton & Co., E. F. Booth 948. Metal cleaners and rust preventives; strippable plastic coating.

Jackson Buff Corp. Booth 1928. Buffing wheels.

Jensen Specialties, Inc. Booth 1806. Infrared ovens.

Koch Sons., Inc., George. Booth 2816. Finishing machine for small parts; water-wash spray booth.

L'Hommedieu & Sons Co., Chas. F. Booth 250. Plating generators and barrels; polishing lathes and wheels; buffs and buffing compositions.

Manderscheid Co. Booth 146. Buffing and polishing accessories.

Manhattan Rubber Div. Booth 1215. Abrasive finishing wheels; diamond wheels.

Martindale Electric Co. Booth 1516. Rotary burs and files.

Metal Finishing Service. Booth 2530. Microblast honing equipment; hydroblast and mechanical blast equipment.

Metallizing Co. of America. Booth 2336. Metal spraying equipment.

Miskella Infra-Red Co. Booth 2415. Infrared burning and baking units.

National Carbon Co., Inc. Booth 838. Heat exchanger for pickling and plating tanks; pipe and fittings for corrosive fluids.

Osborn Mfg. Co. Booth 2407. Power-driven brushing wheels and brushes; maintenance brushes; paint and varnish brushes.

Packer Machine Co. Booth 1928. Automatic buffing, deburring and polishing machinery.

Pangborn Corp. Booth 409. Blast cleaning and shot-peening equipment; dust collectors.

Park Chemical Co. Booth 634. Polishing wheel cements.

Peters-Dalton, Inc. Booth 1828. Complete conveyerized miniature paint finishing system.

Phillips Mfg. Co. Booth 1322. Vapor degreasers; metal washers.

Porter-Cable Machine Co. Booth 1325. Wet and dry abrasive belt machines.

Porter-McLeod Machine Tool Co., Inc. Booth 1717. Polishing machine; mirror finishing and glazing machine.

Powder Weld Process Co. Booth 1630. The Powder Weld process using fragmented materials in plating, and coating with enamels and plastics.

Ransohoff, Inc., N. Booth 1020. Washing, rinsing and drying machines.

Solventol Chemical Products, Inc. Booth 448. Multiple-phase cleaning liquids; rust preventives.

Standard Electrical Tool Co. Booth 1914. Grinders; buffers and polishers.

Standard Plating Rack Co. Booth A-1821. Plating racks.

Stoody Co. Booth 829. Borium blast cleaning nozzles.

Udylite Corp. Booth 350. Plating machines; barrels; polishing machines; generators.

Upton Electric Furnace Div. Booth 536. Furnaces for aluminizing of steel; fluxing for galvanizing and tinning.

Vacu-Blast Co., Inc. Booth 2235. Dustless blast cleaning equipment.

Vapor Blast Mfg. Co. Booth A-1814. Liquid honing cabinets and supplies.

Welding Equipment and Accessories

Air Reduction Sales Co. Booth 330. Heliwelding equipment; tracing device; flux-injection cutting equipment.

Alloy Rods Co. Booth 1809. Alloy, mild steel and low-alloy steel arc welding electrodes.

American Brake Shoe Co. Booth 342. Hard surfacing and reclamation welding products.

American Brass Co. Booth 939. Welding rods.

Ampco Metal, Inc. Booth 110. Welding rod and electrodes; spot welder tips; holders and parts.

Arcos Corp. Booth 1730. Stainless steel, high and low-alloy arc welding electrodes. Oxy-arc cutting equipment.

Bastian-Blessing Co. Booth 108. High-pressure cylinder valves; manifolds; line and station regulators.

Champion Rivet Co. Booth 2708. Welding electrodes; helmets; electrode holders.

Cullen-Friestedt Co. Booth A-1820. Welding positioners.

Division Lead Co. Booth A-2635. Solders.

DoAll Midwest Co. Booth 2315. Taylor-Hall spot welders.

Eutectic Welding Alloys Corp. Booth 548. Flux-coated gas and arc welding rods.

Fansteel Metallurgical Corp. Booth 2115. Resistance welding electrodes and holders; hard facing metals.

General Electric Co. Booth 1128. Inert-arc welders; a.c. & d.c. welders, electrodes and accessories.

Handy & Harman. Booth 150. Silver brazing; torch brazing; rotary brazing table.

Harnischfeger Corp. Booth 1202. Arc welders; welding electrodes; welding positioners.

Haynes Stellite Co. Booths 838 and 840. Hard facing materials.

Hobart Brothers Co. Booth 906. Electric arc welding equipment.

Jackson Products. Booth 1909. Electrode holders and arc welding accessories; eyeshields.

20-433. Manufacture of Fuel-Injection Equipment. *Engineering*, v. 164, July 4, 1947, p. 9-10, 12.

Apparatus and techniques used by British firms.

20-434. Threading. Part VIII. Guy Hubbard. *Steel*, v. 121, July 28, 1947, p. 76-78, 102, 104.

A few highlights on the development of screws and screw making. Techniques of today involve 25 varieties of modern machine tools.

20-435. Microinch Machine Setups. H. J. Chamberland. *Steel*, v. 121, July 28, 1947, p. 79, 92.

The advantages of providing gage blocks to machine operators, in order to improve product quality. The usual objections to such a policy are discounted.

20-436. Simultaneous Internal and External Threading of Bushings. *Iron Age*, v. 160, July 31, 1947, p. 49.

Some 1100 threaded parts per hour for shock absorbers, knee action and other assemblies are produced on a 10-spindle Allen multiple drill press.

20-437. Modern Developments in Precision Boring Practice. Carroll R. Alden. *Iron Age*, v. 160, July 31, 1947, p. 50-55.

Practical examples of single and multiple boring operations on both large and small parts.

20-438. Automatic Sizing Unit. *Iron Age*, v. 160, July 31, 1947, p. 61-62.

A standard engine or toolmaker's lathe can be converted from manual to automatic operation for such work as step shaft turning, boring, and contour turning, or any combination of these operations.

20-439. Tables for Use in Milling Cutter Calculations. K. G. Molnar. *Machinery (London)*, v. 71, July 10, 1947, p. 39-42.

Use of tables; how the various values required for the formulas are obtained in ordinary shop practice.

20-440. Making Small Automatics. *Machinery (London)*, v. 71, July 10, 1947, p. 43-45.

Operations in manufacture of machine tools by British firm.

20-441. Fixtures Make Disk Grinders Versatile. Fred C. Schaub. *American Machinist*, v. 91, July 31, 1947, p. 73-77.

Rapid finishing can be done on single and double-spindle units with properly designed fixtures.

20-442. Research Makes Milling Cutters Behave. Chester Ricker. *American Machinist*, v. 91, July 31, 1947, p. 83.

Review of paper presented by A. O. Schmidt at meeting of Detroit Section of A.S.T.E. Basic experimental work on materials and designs of cutting tools.

20-443. Piston Pins Centerless-Lapped to Tenths. John Nylen. *American Machinist*, v. 91, July 31, 1947, p. 84-87.

Six grinders and three lappers, tied together in a continuous line by chain conveyers, produce 1700 to 2600 replacement pins per hour to close tolerances.

20-444. Practical Ideas. *American Machinist*, v. 91, July 31, 1947, p. 107-112.

Rubber wheel cuts short springs, by C. E. Lambert. Micrometer layout tool gives greater accuracy, by Harry Fox. Space multiple threads without touching leadscrew, by Frank T. Lynch. Miking drills, by M. J. Curcio. Broach-iron solves micro-finish problem, by Dana J. Mulholland. Inclined internal fly cutter mills elliptical punches, by W. W. Brubaker. Floating center drill locates rod centers, by Harry F. Schick, Jr. Hinged drill socket saves tailstock feeding, by H. Moore. Cube aids grinding setups, by W. B. Hurt. Toolbit mockups insure uniform regrinds, by George Burnley. Screw cutting lathe graduates scales, by U. Wheatley. Universal V-block jig establishes hole centers, by Gerhard Wenke. Lightweight handwheel, by W. Heinemann. Fast multiple threading, by C. D. MacKinnon.

20-445. The M.S.E. Optical Drill Chuck. *Machinery Lloyd (Overseas Edition)*, v. 19, July 5, 1947, p. 87.

New device combines a tool and a measuring instrument.

20-446. The Machining of Monel, Nickel and Inconel. *Machinery Lloyd (Overseas Edition)*, v. 19, July 5, 1947, p. 88-89.

Design of tools and types of toolsteel required; cutting fluids; recommended practices.

20-447. The Application of Butt Welded Tools. *Edgar Allen News*, v. 26, July 1947, p. 861-863.

How Superweld high speed tools are made by Edgar Allen, Ltd. Results of destruction test. (To be continued.)

20-448. Designing and Using Drill Jigs. C. W. Hinman. *Machine and Tool Blue Book*, v. 43, Aug. 1947, p. 137-142, 144.

Eight general types of commonly used drill jigs.

20-449. Increased Production by the Use of Speed Lathes. S. E. Wright. *Machine and Tool Blue Book*, v. 43, Aug. 1947, p. 147-148, 150-152.

A number of applications of the speed-lathe principle, such as revolving the part to be finished for polishing, deburring, grinding, lapping.

20-450. Centerless Thread Grinder. M. S. Ghesdahl. *Machine and Tool Blue Book*, v. 43, Aug. 1947, p. 155-156, 158, 160-161.

Technique produces, after heat treating, 15,000 to 20,000 finished screws in one day.

20-451. Using Carbides in Metalworking. H. A. Frommelt. *Machine and Tool Blue Book*, v. 43, Aug. 1947, p. 181-182, 184-188, 190.

Carbide milling S.A.E. 1020 cold rolled steel with a 1-hp. milling machine.

20-452. Tooling the Automatic Screw Machine. Part XIX. Noel Bridle. *Modern Machine Shop*, v. 20, Aug. 1947, p. 108-112, 114, 116, 118, 120, 122, 124, 126.

A comparison of various makes of automatic screw machines.

20-453. The Flaming Saw. Waldo C. Wright. *Modern Machine Shop*, v. 20, Aug. 1947, p. 142, 144, 146, 148, 150.

Use of rapidly moving, dull-blade bandsaw to cut metals by melting rather than cutting.

20-454. Ideas From Readers. *Modern Machine Shop*, v. 20, Aug. 1947, p. 182, 184, 189-190, 192, 194.

Marking off tube joints, by E. R. Yarham. Saving time on steam line repairs, by Herbert Thayer Bruce. Air-operated clamps on milling fixture, by J. Earl Spellman. Stapling better than stitching for buffs, by A. H. Waychoff.

20-455. Mechanisms of Metal Cutting. W. H. Oldacre and H. A. Erickson. *Mechanical Engineering*, v. 69, Aug. 1947, p. 655-657.

Chip contours provide information concerning the process of chip formation.

20-456. Cutting-Off. Guy Hubbard. *Steel*, v. 121, Aug. 4, 1947, p. 92-94, 128.

Trend toward automaticity in production cutting-off operations by use of power hack saws, band saws, and circular saws.

20-457. Indexing Drill Jig. Robert Mawson. *Steel*, v. 121, Aug. 4, 1947, p. 95.

Several interesting features incorporated in a drill jig designed to machine holes in electrical housings.

20-458. Production Drilling With a Universal Machine. *Iron Age*, v. 160, Aug. 7, 1947, p. 66.

New machine tool setup.

20-459. High-Speed Photos Show Cutting Tool Breaking. *Iron Age*, v. 160, Aug. 7, 1947, p. 84.

What happens when a fly cutter on a milling machine is broken by overloading through increasing the rate of feed beyond that prescribed for the work.

20-460. Gear Making. Guy Hubbard. *Steel*, v. 121, Aug. 11, 1947, p. 80-82, 90.

The history of the development of the gear industry.

20-461. Effects of Grinding on Physical Properties of Hardened Steel Parts. H. E. Boyer. *American Society for Metals Preprint No. 23*, 1947. (To be published in *Transactions* for 1948.)

A study of the unbalanced residual stresses induced by grinding of highly hardened steel parts and the ultimate effect of such stresses upon physical properties. Hardened S.A.E. 52100 steel was used although the findings may be applied to other steels of the deep-hardening type. Fatigue and other physical properties are seriously affected by incorrect planning of grinding operations.

20-462. A New Method of Metal Cutting. *Engineers' Digest (American Edition)*, v. 4, July 1947, p. 303.

The new process developed in Russia is based on a combination of electrolytic and spark action. Advantages are freedom from dependence on hardness of the metal being cut, ability to cut hardened parts without loss of hardness, increased accuracy of cutting because of small heat release, ability to cut sintered compacts, and machining and cutting of parts of various shapes used in gas-turbine construction.

20-463. Electro-Erosion Cutting of Hard Metal and Steel. T. P. Rekshinskaya. *Engineers' Digest (American Edition)*, v. 4, July 1947, p. 304-305.

Experimental investigation of process at the Gorki Automobile Works used for cutting all types of hard metal of any sections used at present in the motor industry, hardened steels and other very hard metals provided the sectional area does not exceed 16 sq. cm., and bar stock provided the sectional area is not in excess of 5 sq. cm. (Translated and condensed from *Automobilnaya Promishlenost*, no. 5-6, 1946, p. 12-15.)

20-464. Measuring in the Workshop. P. Leinweber. *Engineers' Digest (American Edition)*, v. 4, July 1947, p. 335-338.

The problem of restarting factory production without the benefits of modern machine tools and measuring equipment, as is necessary in Germany today. (Translated and condensed from *Die Technik*, v. 2, Jan. 1947, p. 1-6.)

20-465. Bicycle Production. *Machinery (London)*, v. 71, July 17, 1947, p. 59-65.

Methods employed in the tube and machine shops at the Raleigh Works for frame assembly.

20-466. Graphs for Use in Milling Cutter Calculations. K. G. Molnar. *Machinery (London)*, v. 71, July 17, 1947, p. 66-72.

Supplement to data given in July 10, 1947 issue.

20-467. Two Swiss Machine Tools. *Engineer*, v. 184, July 18, 1947, p. 64.

Milling cutter milling machine and hydraulic broaching machine.

20-468. A Milling Cutter Grinder. *Engineer*, v. 184, July 18, 1947, p. 64-65.

Swiss machine.

20-469. A New High-Speed Center Lathe. *Machinery Lloyd (Overseas Edition)*, v. 19, July 19, 1947, p. 82-83.

Description and application.

20-470. A Tooling Program for Forged Globe Valves. Part IX. Carl F. Benner. *Tool & Die Journal*, v. 13, Aug. 1947, p. 53-58.

Four sets of operations: reducing the stem rod by turning, followed by thread cutting, chamfering, and facing; cutting a hexagonal shape on the stem for attachment of the handle; making the "jam nut" for holding the handle on the stem; and drilling and burring the hole through the handle. (To be concluded.)

20-471. Midget Mills for Die and Sheet Metal Finishing. *Tool & Die Journal*, v. 13, Aug. 1947, p. 59-60, 64, 109.

Mills made by Severance Tool In-

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Welding (Cont.)

Kern Co., John A. Booth 2923. A.C. arc welders.

Krieg Co., Charles W. Booth 1529. Electric, gas and Heliarc equipment; brazing and welding fluxes; brazing alloys.

Lincoln Electric Co. Booth 734. Arc welding machines, generators and electrodes.

Linde Air Products Co. Booths 838 and 840. Oxy-acetylene welding and cutting equipment; Unionmelt welding; Heliarc torches.

Liquid Carbonic Corp. Booth 2417. Gas welding and cutting equipment.

Machinery & Welder Corp. Booth 1137. Resistance welding machines.

Mallory & Co., Inc., P. R. Booth 2701. Resistance welding electrodes, holders and dies.

McKay Co. Booth 2636. Mild steel, stainless steel, and special purpose electrodes.

Metal & Thermit Corp. Booth 316. Arc welding electrodes and accessories; Thermit welding process.

Metallizing Co. of America. Booth 2336. Electrical, impregnating and metallizing equipment for salvaging.

Mid-States Equipment Corp. Booth 2536. A.C. welders; home welders.

Miller Motor Co. Booth 2740. Air cylinders; hydraulic cylinders; booster; accumulator; counterbalance cylinder.

National Cylinder Gas Co. Booth 107. Shield-O-Matic welding machines; arc welders; oxy-acetylene welding and cutting equipment; generators and accessories.

National Time & Signal Corp. Booth 2435. Resistance welding timers.

Page Steel and Wire Division, American Chain & Cable Co. Booth 1219. Electrodes and welding rods.

Peterson Welding Laboratories. Booth 1818. Preheaters; welding and brazing fluxes.

Powder Weld Process Co. Booth 1630. The Powder Weld process using fragmented materials for welding, brazing, hard surfacing.

Precision Welder & Machine Co. Booth 1137. Resistance welders.

Progressive Welder Co. Booth 1242. Spot and flash welders.

Ransome Machinery Co. Booth 130 Welding positioners.

Salkover Metal Processing. Booth 126. Copper brazing and silver soldering

Sciaky Brothers, Inc. Booth 1254. Spot seam, flash butt, gun welding machines.

Scientific Electric Division, "S" Corrugated Quenched Gap Co. Booth 518. Induction and dielectric heaters; insulators.

Smith Corp., A. O. Booth 1702. Arc welding electrodes; a.c. arc welders.

Stoody Co. Booth 829. Hard facing alloys.

Tri-Arc Corp. Booth 1721. Electronic high-frequency unit for a.c. or d.c. welder; small portable arc welder; carbon arc torch.

War Assets Administration. Booth 1249. Surplus property—samples and literature.

Wells, Inc., Martin. Booth 2824. Electrode holders.

Weltronic Co. Booth 2915. Electronic resistance welder controls and timers.

Westinghouse Electric Corp. Booth 253. Transformers, timers and controls; brazing equipment.

Yoder Co. Booth 1241. Electric resistance weld tube mill.

Testing and Inspection Equipment

Applied Research Laboratories. Booth 2516. Spectrographic high precision source unit; universal arc-spark stand; projection comparator-densitometer.

Baker & Co., Inc. Booth 1505. Laboratory furnace; Purifier, indicator and Puridryer; cadmium nickel alkaline battery.

Baldwin Locomotive Works. Booths 329 and 1042. Tensile, creep and fatigue testing machines; strain gages.

Bausch & Lomb Optical Co. Booth 1422. Research metallograph; metallurgical, stereoscopic, shop and Brinell microscopes.

Bristol Co. Booth 339. Dilatometer; recording gage and thermometer; cycle controller; resistance thermometer.

Brown Instrument Co. Booth 1138. Potentiometer pyrometers; pneumatic and electric controllers; thermometers.

Buehler, Ltd. Booth 1615. Sample preparation equipment.

Central Scientific Co. Booth 1509. Laboratory apparatus and instruments—electropolisher; titration-pH apparatus; electro-analyzer; combustion furnace.

Clark Instrument, Inc. Booth 1816. Rockwell hardness testing machines.

Detroit Testing Machine Co. Booth 1610. Hardness, ductility and tensile testing machines.

Dietert Co., Harry W. Booth 1019. Carbon and sulphur determinators; moisture testing equipment; laboratory combustion furnaces.

Dillon & Co., Inc., W. C. Booth 943. Universal testing machines; dynamometers; thermometers; pressure gages; weight indicators.

DoAll Midwest Co. Booth 2315. Selector for inspecting, sorting and counting.

Eastman Kodak Co. Booth 1226. High-speed motion picture equipment; photographic materials; Kodak Transfax—a reproduction process.

dustries, Inc., Saginaw, Mich., for making dies, deburring, and other operations on stamped and sheet metal parts.

20-472. Tooling Methods for Working Magnesium. James V. Winkler. *Tool Engineer*, v. 19, Aug. 1947, p. 17-20.

A general discussion with some remarks on the properties, uses and advantages of magnesium.

20-473. Grinding Spur and Helical Gear Teeth. John C. Dixon. *Tool Engineer*, v. 19, Aug. 1947, p. 21-28.

Progress from ancient times, with an emphasis on present-day gear grinding methods and machines.

20-474. Grinding Wheels Developed for Wide Application. *Machinery*, v. 53, Aug. 1947, p. 156-157.

New line of grinding wheels with a vitrified bond that offers a minimum amount of interference to the cutting action of abrasive.

20-475. Modern Methods of Cutting Truck Transmission Gears. *Machinery*, v. 53, Aug. 1947, p. 160-162.

Cutting of truck transmission gears by three different methods and finishing on two types of shaving machines. Simultaneous shaving of two gears increases production.

20-476. Ingenious Mechanisms. *Machinery*, v. 53, Aug. 1947, p. 163-165.

Follower mechanism for contour milling of grooves, by Charles E. Lambert. Mechanism for operating dial feed and radially positioned multiple punches, by Charles F. Smith.

20-477. Tool Engineering Ideas. *Machinery*, v. 53, Aug. 1947, p. 167-169.

Modified lathe setup for continuous threading of bar stock, by Mark W. Purser. Multiple belt drive with thrust equalizing arrangement, by Martin H. Ball. Milling threads on valve stems, by E. N. Olson.

20-478. Specific Studies Pertaining to Tool Wear, Chip Characteristics, and Surface Finish of Free-Cutting Steels. G. P. Witteman. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 643-656.

How increases in hardening elements will affect machinability. Studies of chip sizes and characteristics give information on machining properties and tool wear. Microhardness tests are used to study metallurgical differences and the effect of elements such as nitrogen and boron on the various constituents of the steel.

20-479. Effect of Varying Relief Angles When Face-Milling Cast Iron With Sintered-Carbide-Tipped Cutters. O. W. Boston and W. W. Gilbert. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 657-663; discussion, p. 663.

Tests to determine tool wear, tool life, and power consumption when varying the relief angles on 0° and 45° peripheral-cutting-edge-angle face-milling cutters.

20-480. Effect of Microstructure on Machinability of Cast Irons. Parts I and II. Michael Field and E. E. Stansbury. *Transactions of the A.S.M.E.*, v. 69, Aug. 1947, p. 665-673; p. 675-682.

Test bars prepared to study the effect of the following structures in the milling of cast iron: graphite-pearlite of various gradations of coarseness; graphite-pearlite plus about 5% of free-carbide segregation; graphite-ferrite. Quantitative results of the relative machinability of these structures are presented in terms of tool life, power requirements, surface finish. Tool life, power requirements, and surface finish are determined for straight malleable iron and one type of pearlitic malleable iron.

20-481. Oil Mist Can Be Eliminated. W. F. Herst and H. B. Heyl. *American Machinist*, v. 91, Aug. 14, 1947, p. 93.

Use of an electrostatic air cleaner to eliminate oil mist created by automatic screw machines.

20-482. Special Setups Turn Spherical Surfaces. C. A. Bloom. *American Machinist*, v. 91, Aug. 14, 1947, p. 108-112.

Tooling for precision boring and turning of ball and socket sections for self-aligning bearings and pillow blocks on a production basis.

20-483. Practical Ideas. *American Machinist*, v. 91, Aug. 14, 1947, p. 123-128.

Eccentric pivot bars made in square-bored adapter chuck, by C. W. Pressey. Lathe controls spacing, by J. C. Magee. Offset jack, by Wm. J. Coles. Lathe carriage stop, by Allan B. Nixon. Grinder attachment, by George A. Giller. Drill press stop, by Lloyd Sturmp. Dashed lines, by Henry H. Moore. Lathe setup cuts lugs, by Donald A. Baker. Inside countersink, by Allan B. Nixon. Checking drilled bolts, by Franz Sauerisch. How to check angle plates, by Theodore A. Buza. Squaring rods, by George E. Jones. Lathe toolholder jack, by M. S. Khaja Hohideen. Drilling parallels, by Cliff Bossmann. Tapered key fitting, by William Holmes. Magnetic wheel dresser, by D. E. McDonald. Spring winder. Boring bar holder, by C. W. Lightfoot. Chuck shoe, by Clement Reichel. Reversed boring, by Arthur F. Hird. Collet adapter, by C. Clarke. Adjustable height drill jig, by H. Moore. Multiple toolholder, by Arnold Dyck.

20-484. Honing and Lapping. Guy Hubbard. *Steel*, v. 121, Aug. 18, 1947, p. 86-88, 120.

History, development and significance of basic techniques in metalworking. Methods for removing minute layers of metal in precision sizing and finishing by modern machine tools. (Concluded.)

20-485. Air Tools Speed Manufacture of Automobile Bodies. *Steel*, v. 121, Aug. 18, 1947, p. 89-90, 129.

Tools and equipment in use at Nash body plant of Nash-Kelvinator Corp.

Section 20. For additional annotations indexed in other sections, see: 3-211; 7-325; 8-111; 11-124; 16-97; 18-156; 21-73; 23-257-259-274; 26-125.

21 LUBRICATION and Friction; Bearings

21-69. Metals Grinding Machinery Lubrication. *Lubrication*, v. 33, July 1947, p. 69-80.

Illustrated by diagrams and photographs.

21-70. The Influence of Lubricating Oil on Cylinder Wear. B. M. Berry. *Society of Automotive Engineers, Inc., Preprint*, 1947, 2 p.

A general discussion; wear testing procedures.

21-71. Synthetic Resin Bearings. F. W. Jones. *Plastics (London)*, v. 11, July 1947, p. 367-371.

Bearings for steel mills. (Reprinted from *Journal of the Iron and Steel Institute.*)

21-72. How to Work With Cutting Fluids. Harold L. Flynn. *American Machinist*, v. 91, July 31, 1947, p. 89-96.

Cutting-fluid action; types; selection and application; handling.

21-73. The Mechanism of Cutting Fluid Action. Milton C. Shaw. *Journal of Applied Physics*, v. 18, July 1947, p. 683.

Arguments supporting the hypothesis that certain effective metal-cutting fluids react chemically with the metal during the cutting operation.

21-74. Hydrostatic Lubrication. Dudley D. Fuller. *Machine Design*, v. 19, Aug. 1947, p. 115-120.

Application of hydrostatic lubrication to step bearings.

21-75. Centralized Oil Reclamation and Distribution. *Steel*, v. 121, Aug. 11, 1947, p. 83-84, 105-106, 108.

System in use at International Harvester's West Pullman ball-bearing plant.

21-76. Use of Wire Drawing Compounds. E. L. H. Bastian. *Wire and Wire Products*, v. 22, Aug. 1947, p. 577-580.

The development of improved wire-drawing compounds and their application.

Section 21. For additional annotations indexed in other sections, see: 7-295; 9-91; 23-258.

22 WELDING Flame Cutting; Riveting

22-368. Brazing in Electric Furnaces. S. DeDomenico and J. A. Comstock. *Metal Progress*, v. 52, July 1947, p. 71-76.

Advantages of furnace brazing; atmospheres for furnace brazing; strength of brazed joints; metals and alloys which may be brazed; types of joints and production equipment.

22-369. Flame Cutting Structural Shapes in Quantity. *Steel*, v. 121, July 21, 1947, p. 100-101.

Equipment designed and built by Standard Steel Construction Co., Ltd., Port Robinson, Ont., for cutting large quantities of I and H-beams and channels at controlled speeds of 4 to 24 in. per min.

22-370. Furnace Brazing 12% Chromium Low Carbon Steel. T. H. Gray. *Steel*, v. 121, July 21, 1947, p. 105-106, 124, 127-128.

Tests in joining blades of steam-turbine rotors in order to modify their mechanical behavior reveal that by controlling brazing temperatures, 50 to 100% stronger joints are made. Turbine with brazed blades operated for 1000 hr. at 932° F. and 1250 psi. without failure.

22-371. Induction Soldering Speeds Kitchen Utensil Production. L. Gise and J. R. Stewart. *Industrial Heating*, v. 14, July 1947, p. 1098, 1100, 1102.

Methods used at Adel Precision Products Corp., Huntington, W. Va.

22-372. Use of Silver Alloys in Brazing. H. A. Smith and P. A. Koerner. *Aero Digest*, v. 55, July 1947, p. 54-56, 87.

Design principles and applications to aircraft construction.

22-373. Welding and Cutting. R. D. Williams. *Metals Review*, v. 20, July 1947, p. 5-8, 47.

Reviews eighteen months' progress as reflected in the technical literature. New features in various welding processes. Difficulties in welding different metals and alloys. Recent practice in brazing, soldering and cutting. Welding research and new applications of welding.

22-374. Welding Equipment. *Metals Review*, v. 20, July 1947, p. 9-11, 14-15, 17, 19.

150 new products and processes developed by the manufacturers for various types of welding electrodes and accessories. Timers, controls. Equipment for hard surfacing, cutting, brazing, soldering. Fixtures and positioners.

22-375. Arc Welding Modifies Flaptrack. *Automotive Industries*, v. 97, July 15, 1947, p. 37.

Fixture used for reworking a standard airplane stock part.

22-376. Constituents of Arc Welding Electrode Coatings. *Iron Age*, v. 160, July 24, 1947, p. 67.

Basic coating compositions of the fundamental electrodes and functions of the coating material in arc welding electrodes.

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Testing (Cont.)

Foxboro Co. Booth 926. Temperature measurement and control equipment.

Gaertner Scientific Corp. Booth 1517. Toolmaker microscopes; automatic circular dividing machine; filar micrometer microscopes; micrometer slides; precision scales; wavelength spectrometer.

General Electric Co. Booth 1128. Flaw detectors; fatigue machines; control equipment; gages and instruments.

General Electric X-Ray Corp. Booth 1128. X-ray diffraction apparatus and radiographic equipment.

Gordon Co., Claud S. Booth 525. Furnace atmosphere indicator, temperature controls; thermocouples and accessories.

Green Electric Co., W. Booth 349. Electronic equipment and devices; laboratory apparatus.

Illinois Testing Laboratories, Inc. Booth 920. Temperature, air and dew point measuring instruments.

Kelley-Koett Mfg. Co. Booth 1515. Radiation detection instrument for location of beta particles and gamma-ray sources and measurement of intensity of X-ray radiations.

King, Andrew. Booth 1232. Portable Brinell hardness tester; folding Brinell microscope.

Krouse Testing Machine Co. Booth 526. Repeated stress testing machines.

Laboratory Equipment Corp. Booth A-1807.

Leeds & Northrup Co. Booth 1101. Temperature recorders and controllers; checking and measuring instruments.

Magnetic Analysis Corp. Booth 1308. Magnetic inspection equipment; comparators for sorting; demagnetizers.

Magnaflux Corp. Booth 541. Magnaflux, Sonigage and Stresscoat equipment.

North American Philips Co., Inc. Booth 145. Diffraction equipment and accessories; Geiger counter X-ray spectrometer; fluorescent analysis unit.

Olsen Testing Machine Co., Tinius. Booth 345. All-electronic testing machine; universal testing machines.

Pako Corp. Booth 1132. Photographic and X-ray film supplies and appliances.

Partlow Corp. Booth 714. Temperature controls; gas controls; timers.

Picker X-Ray Corp. Booth 426. 50-kvp. industrial X-ray inspection and testing unit; diffraction unit.

Precision Scientific Co. Booth 315. Cut-off machine; specimen mounting presses; polishing machines.

Pyrometer Instrument Co. Booth 422. Optical, radiation, immersion, surface, indicating, bi-optical and micro-optical pyrometers.

RCA Victor Div., Radio Corp. of America. Booth 2714. Electron microscope; vacuum gage.

Riehle Testing Machines Division, American Machine & Metals, Inc. Booth 1326. 60,000-lb. universal testing machine.

Sargent & Co., E. H. Booth 1722. The Polarograph; electrolytic analyzer; analytical balances.

Spencer Thermostat Co. Booth 1817. Temperature controls.

Sperry Products, Inc. Booth 2308. Supersonic reflectoscope; reflectogage for measuring thickness.

Taco-West Corp. Booth 1234. Automatic control equipment; electronic pyrometers.

Tempil Corp. Booth 1622. Temperature indicating materials—crayons, liquid, pellets.

Wheelco Instruments Co. Booth 515. Indicating pyrometer controllers; recorders; combustion safeguard; operation recorder.

Wilson Mechanical Instrument Co., Inc. Booth 938. Rockwell hardness tester; Knoop indenter; Tukon tester.

Materials Handling

Automatic Transportation Co. Booth 740. Electric industrial trucks; hand trucks.

Cambridge Wire Cloth Co. Booth 2640. Metal mesh conveyer belts. Wire cloth and wire screening.

Alvey-Ferguson Co. Booth 1037. All types of conveyer rollers and chain.

22-377. Theory of Heat Convection in Arc Welding. N. N. Rykalin. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 61-82. (In Russian.)

The theory proposed establishes the dependence of local heating and cooling of the welded materials on the conditions and rate of welding as well as on the shape and thermo-physical properties of the metals welded. The laws of heat convection during arc welding and temperature distributions. 11 ref.

22-378. Experiments on the Production of Lined Apparatus. E. M. Lapitskaia and I. I. Gerasimenko. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 29. (In Russian.)

Both spot and linear-welding techniques were used for the application of corrosion resistant steel sheets to the interior of tanks.

22-379. Unscrewing Broken Pins With the Aid of Electric Welding. L. Z. Dolgitser. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 30. (In Russian.)

Diagram illustrates repair technique.

22-380. Building up of a Hard Metal Alloy by Welding With High-Frequency Current. E. M. Kuzmak and A. I. Kurdin. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 1-4. (In Russian.)

A method of hard surfacing for drill bits, using high-frequency current. Basic factors influencing the method and different methods for depositing hard metals and alloys.

22-381. Investigation of Electric-Arc Welding Under Flux. L. N. Kushnarev. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 5-9. (In Russian.)

Explanations of the above process found in the literature are conflicting. Investigation indicated that, depending on conditions, the process is either purely an arc process or the continuous passage of current through the flux without arc formation. In some cases these two processes may alternate.

22-382. Electrodes With Cellulose Coating. V. D. Taran. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 10-13. (In Russian.)

Method of production of two new coated electrodes. The "OT-3" type (24.3% ground cellulose, 27.3% feldspar, 25.6% titanium dioxide, 10.5% magnesium oxide, 1.3% ground chalk, 5.4% potassium carbonate, and 5.6% ferromanganese), which may be used with direct or alternating current, is highly recommended.

22-383. Strong Butt-Welding Joints. N. N. Prokhorov, N. V. Shiganov, and A. V. Mordvintseva. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 13-16. (In Russian.)

Defects of butt-welding joints; measures proposed for their elimination. Mechanical treatment of the shoulders of materials to be welded together.

22-384. Physics of the Welding Arc. M. Ia. Broun. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 20-22. (In Russian.)

The fundamentals of the process of ionization in the welding arc. Introduction into the arc of elements having low ionization potential may give rise to a decrease in the amount of energy emitted, hence a decrease in the rate of welding. The importance of determining the optimum amount of stabilizing element in welding-rod coatings or fluxes. 10 ref.

22-385. Oxy-Acetylene Pressure Welding. A. S. Shchekanenko, A. L. Zilberberg, and Ia. N. Kogan. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 23-26. (In Russian.)

Construction of apparatus for the process; the preparation of the ends of pipe for welding; the welding of the pipe, and control apparatus.

22-386. Surface Hardening With the Oxy-Acetylene Torch. S. V. Begun. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 27-28. (In Russian.)

Apparatus and techniques used in the U.S.S.R.

22-387. Flame Cleaning of Metallic Surfaces. S. G. Guzov. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 28-30. (In Russian.)

Techniques and apparatus used in the U.S.S.R. A comparison of performance and costs for two forms of burner—high-pressure and medium-pressure—showing that costs for the high-pressure type are slightly lower.

22-388. Details of Design and Production of Commercial Equipment for Assembly and Welding. N. I. Kazakov. *Avtogennoe Delo (Welding)*, no. 3, 1947, p. 31-32. (In Russian.)

Illustrated by several diagrams.

22-389. Influence of the Basic Parameters of the Electric Arc and Thickness of the Electrode Coating on the Grain Size of Austenite of Weld Metal. V. I. Strokopytov. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 1-7. (In Russian.)

Experimental investigation of various factors for low-carbon structural steel.

22-390. Local Weakening of Welded Seams. I. A. Lipetsky. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 8-12. (In Russian.)

Mechanism of formation of a series of defects in welded seams. Preventive measures.

22-391. Rapid Manual Welding With Deep Penetration. A. S. Chesnokor and A. D. Bondarenko. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 13-17. (In Russian.)

The technique of welding and the results obtained from a new method of manual electric welding using an ultra-short arc resulting in very deep heat penetration.

22-392. Method for Manual-Arc Electric Welding With a Bundle of Electrodes. V. S. Volodin. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 17-20. (In Russian.)

Process in which 2, 3, or 4 electrodes are fastened together, and its application to the welding of pipe lines.

22-393. Production of Highly Efficient Electrodes for Manual Arc Welding. N. M. Sergeiev. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 20-23. (In Russian.)

A new type of double electrode with thin coating. Tests indicated the excellent quality of welding performed with these electrodes. Composition, method of production, and applications.

22-394. Gaseous Corrosion of Welded Samples at High Temperatures. G. N. Kulakova. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 23-25. (In Russian.)

Losses in weight due to atmospheric corrosion of welded specimens held at 800° C. for 100 hr. The three types were aluminum-coated (calorized) steel, a chromium-nickel steel, and a low-carbon steel. The structure of the specimens after exposure. Weight loss results.

22-395. Concerning the Welding of "3M" Copper Steels. N. N. Prokhorov and I. I. Makarov. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 25-27. (In Russian.)

Experimental setup shows properties of the base materials and of the weld metal resulting from use of different electrodes and techniques. Recommendations. The steels contained 0.16 to 0.25% Cu, 0.20 to 0.55% S, 0.18 to 0.53% P, 0.56 to 0.46% Mn, 0.02% Si, and 0.14 to 0.15% C.

22-396. Electric-Arc Welding of Thin Sheets of "E. Ia. I. T." Stainless Steel. F. E. Tretiakov. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 27-28. (In Russian.)

Experiments using two types of electrodes and variation of other factors in welding of steel containing 16 to 20% Cr, 8 to 11% Ni, 1.20% Si, 0.70% Mn, 0.5 to 0.8% Ti, 0.10% C, 0.03% S, and 0.03% P.

22-397. Welding in Repair Work. Concerning Experiences in Electric-Welding Repair of Breaks in Metal Gasoline-Storage Tanks. G. M. Shabanov. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 28-29. (In Russian.)

Diagrams indicate methods used.

22-398. Welding of Cracks in High-Pressure Cylinders. T. P. Trochun. *Avtogennoe Delo (Welding)*, no. 4, 1947, p. 29-30. (In Russian.)

Methods clarified by diagrams.

22-399. Le Soudage a la Presse. (Pressure Welding.) *Revue de l'Aluminium* v. 24, April 1947, p. 120.

A German method for producing airplane radiator parts by pressure welding. The alloy used was Pantal (0.79% Mg, 1.10% Si, 0.85% Mn, 0.39% Fe, 0.02% Ti, 0.13% Cu, 0.15% Zn, 0.05% Ni and balance Al). Other metals may be used with varying success.

22-400. Jigs and Fixtures for Resistance Welding Machines. Howard C. Cogan. *Tool Engineer*, v. 18, July 1947, p. 17-22.

Their design and construction.

22-401. The Welding of Copper and Its Alloys. (Continued.) E. G. West. *Sheet Metal Industries*, v. 24, July 1947, p. 1425-1429, 1435.

Copper-tin alloy welding; gas welding; arc welding; resistance welding; silicon-bronze welding; oxy-acetylene welding; carbon-arc welding; metallic-arc welding; resistance welding; and copper-aluminum alloy welding. 13 ref. (To be continued.)

22-402. Some Fundamental Principles for the Resistance Welding of Sheet Metal. (Continued.) H. E. Dixon. *Sheet Metal Industries*, v. 24, July 1947, p. 1430-1435.

Factors for resistance welding of aluminum-base alloys and for flash and butt welding of light alloys. 48 ref.

22-403. Spot Welding of Some Aluminum and Magnesium Alloys. H. Brooks. *Sheet Metal Industries*, v. 24, July 1947, p. 1436-1440, 1442.

Summarizes a number of reports on investigations carried out by members of the LR.1 Committee of the British Welding Research Assoc. in connection with the spot welding of aluminum and magnesium alloys.

22-404. The Design and Methods of Construction of Welded Steel Merchant Vessels. *Welding Journal*, v. 26, July 1947, p. 569-618.

The final report of a Navy board of investigation. History; design; materials; construction; operating conditions; specific investigations; international exchange of information; findings; conclusions; opinions; recommendations; statistical report of structural failures on welded steel merchant vessels; summary of research investigations; survey of shipyard welding practices; and a classified bibliography. 53 ref.

22-405. Silver Alloy Brazing Lawn Mower Rotors. *Welding Journal*, v. 26, July 1947, p. 636.

The joining of three steel parts—a spider, drive shaft, and bearing retainer—in one operation.

22-406. Note on the Influence of the Water Content of an Electrode Coating on the Hydrogen Content of Weld Metal. W. P. van den Blink. *Welding Journal*, v. 26, July 1947, p. 369s-370s.

Calculation for compositions given by M. W. Mallett shows that addition of water to the arc atmosphere sometimes lowers the partial pressure of hydrogen, hence would reduce the hydrogen content of the weld metal. This is shown to be the case for electrodes of types E6010, E6013, and E6020. On the other hand, weld metal deposited by low-hydrogen electrodes should show higher hydrogen contents if water is added to the coating. Criticizes recent paper by Mallett and Rieppel.

22-407. Contribution to the Study of Expansion and Contraction. P. Berthet. *Welding Journal*, v. 26, July 1947, p. 370s-371s.

Results of French research on the shrinkage of various types of joints

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Materials Handling (Cont.)

Cullen-Friestedt Co. Booth A-1820. Cranes; buckets; steel sheet and plate lifters; lifter systems.

Dillon & Co., Inc., W. C. Booth 943. Electric hoist overload cutouts.

Edwards, Inc., S. H. Booth 1902. Torkspring axle.

Equipto Division, Aurora Equipment Co. Booth 308. Shelving, cabinets, bins, work benches, toolroom equipment.

Gerrard & Co., A. J. Booth 2006. Steel strapping tools; carloading tools; stitching machines; wire loop tying tools.

Harnischfeger Corp. Booth 1202. Electric hoists.

Jensen Specialties, Inc. Booth 1806. Conveyers.

Mine Safety Appliances Co. Booth 1616. Steel grab for handling sheets and plates.

National Engineering Co. Booth 2307. Simpson intensive mixer with loader and exhaust unit.

National Research Corp. Booth 2018.

Rack Engineering Co. Booth 2802. Rack conveyer systems.

Rapids-Standard Co., Inc. Booth 947. Power belt conveyers; aluminum rapid wheel conveyer.

Steel-Parts Mfg. Co. Booth 2318. Conveyers and conveyer belts.

Towmotor Corp. Booth 2030. Fork lift trucks and accessories.

Yale & Towne Mfg. Co. Booth 116. Industrial trucks; hoists; scales.

Plant Equipment

Ameraco Industrial Specialties. Booth 2425. Hydraulic pipe and conduit bends; steel hose and pipe repair.

Behr-Manning Corp. Booth 1711. Safety floor covering for ramps, stairways, machine platforms.

Bradley Washfountain Co. Booth 2707. Washfountains; showers; drinking fountains.

Commonwealth Edison Co. Booth 2002. Industrial use of electric power.

Equipto Division, Aurora Equipment Co. Booth 308. Steel shelving, cabinets, bins, work benches, toolroom equipment.

Executone, Inc. Booth 2815. Communication equipment for offices and plants.

Finnell System, Inc. Booth 2924. Industrial floor machines for wet scrubbing, wax polishing and other maintenance; cleansing agents.

H & H Research Co. Booth 115. Plastic table tops and other top coverings.

Hobart Brothers Co. Booth 906. Grinders; battery chargers; platers; air compressors.

Industrial Tape Corp. Booth 942. Industrial pressure-sensitive tapes.

Jones Co., C. Walker. Booth 2823. Industrial work gloves.

Kewaunee Mfg. Co. Booth 1709. Seating; automatic adjustable chairs and stools.

Martindale Electric Co. Booth 1516. Protective masks; electric maintenance instruments.

Milburn Co. Booth 2717. Protective hand creams; plastic coated safety clothing.

National Industrial Launderers and Cleaners Association. Booth 2524. Industrial uniforms and shop wiping cloths.

National Time & Signal Corp. Booth 2435. Industrial process control sequence timers; signals; program clocks.

Ohio Carbon Co. Booth 2430. Brushes for electric motors and generators; burnishing tools for cleaning commutators; resistors for electronic equipment.

Osborn Mfg. Co. Booth 2407. Power-driven brushes; maintenance brushes.

Spencer Turbine Co. Booth 854. Vacuum cleaning equipment; turbocompressors.

Tennant Co., G. H. Booth 2116. Heavy-duty self-propelled floor machines for removing grease and other soilage; power sweeper; smaller machines.

Publications

American Metal Market. Booth 1915. Daily newspaper of the iron, steel and metal industries.

American Society for Metals. Booth xxxx. *Metal Progress; Metals Review; Transactions;* technical books.

Chilton Co. Booth 2808. *Automotive Industries,* magazines and services.

Hitchcock Publishing Co. Booth 2723. *Machine and Tool Blue Book;* Hitchcock's *Export Sales Catalogs.*

Industrial Bulletin. Booth 1503.

Industrial Press. Booth 444. *Machinery;* engineering books and data.

Industrial Publishing Co. Booth 639. *Industry and Welding; Flow; Die Castings.*

Iron Age. Booth 245. *The Iron Age;* handbooks; manuals and reprints.

Light Metal Age. Booth 1901.

Metal Industry Publishing Co. Booth 2715. *Metal Finishing* and *Organic Finishing.*

Modern Metals. Booth 2635.

National Industrial Publishing Co. Booth 2829. *Industrial Heating.*

Penton Publishing Co. Booth 209. *Steel; Foundry; Machine Design; New Equipment Digest; Revista Industrial;* technical books.

Reinhold Publishing Corp. Booth 1337. *Materials and Methods; Metal Industries Catalog;* technical books.

Sutton Publishing Co., Inc. Booth 2418. *Metal-Working Equipment.*

Welding Engineer. Booth 1715. *Welding Engineer;* handbooks, textbooks.

Western Metals. Booth 1918.

used in aircraft construction. How the shrinkage of large structures can be computed, from the results for individual tests. Joints in plates and tubes were studied for unalloyed steel, Cr-Mo steel, aluminum, and alloys of aluminum containing 3, 5, and 7% Mg. (Translated and condensed from *Soudure*, v. 1, 1947, p. 25-33.)

22-408. An Investigation of Beams With Butt Welded Splices Under Impact. Part I. Impact and Static Tests on Beams With Butt Welded Splices and Plain Beams, Including Preliminary Studies of the Resistance to Impact at Subzero Temperatures. W. J. Krefeld and E. C. Ingalls. *Welding Journal*, v. 26, July 1947, p. 372s-400s.

Results of investigation conducted at Columbia University.

22-409. Auxiliary Tests on the Steels of I-Beams Tested in Flexural Impact at Columbia University. George G. Luther, Wells E. Ellis, and Carl E. Hartbower. *Welding Journal*, v. 26, July 1947, p. 400s-408s.

Results of examination at the Naval Research Laboratory of the microstructure of I-beams. Charpy V-notched bars and high-constraint nick-bend specimens were also prepared from various sections of the beams and tested over a range of temperatures.

22-410. An Investigation of Beams With Butt Welded Splices Under Impact. Part II. A Mathematical Treatment of the Generalized Hertz Impact of a Mass on a Simply Supported Beam. M. G. Salvadori. *Welding Journal*, v. 26, July 1947, p. 409s-432s.

Approximate solution of the generalized Hertz central impact of a mass on a simply supported beam; impact on systems with a single degree of freedom; the Hertz generalized impact. 10 ref.

22-411. Metallurgy of Arc Welding Using Thick Coated Electrodes. A. S. Ogienetsky. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 7-11. (In Russian.)

Electrode coating and the physicochemical bases of metal-seam protectors. The influence of nitrogen, oxygen, and hydrogen, on the structure and properties of the seam metal. 12 ref.

22-412. Deoxidation of the Seam Metal During Arc Welding. A. A. Alov. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 12-16. (In Russian.)

The mechanism of oxidation and deoxidation of the seam during arc welding. Methods of deoxidation with carbon, silicon, and manganese.

22-413. Cutting With an Oxygen-Lance. K. K. Khrenov, G. B. Evseev, and M. S. Nikitin. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 21-24. (In Russian.)

This method, only slightly known in the U.S.S.R., was investigated to determine its applicability to low, medium, high-carbon and alloy steels. Hardness of medium and low-carbon steel is not markedly affected by oxygen-lance cutting, but high-carbon and alloy steels must be preheated to avoid cracks and loss of temper.

22-414. Operation of the Structure-Welding Trust. A. S. Falkevich. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 24-27. (In Russian.)

Methods of structural welding on oil and gas storage tanks, and welding in pipe line construction.

22-415. Beading of Bronze on Steel Surfaces by Means of an Electric Arc. V. A. Ivanor, A. V. Shadrin, and F. I. Shorin. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 28. (In Russian.)

A new method of fusing anti-friction bronze to a steel surface.

22-416. Dependence of the Rate of Electrode Fusion on the Value of Internal Energy of the Crystal Lattice. I. A. Lipetsky. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 1-3. (In Russian.)

A qualitative relationship was established for the above as a result of an experimental investigation. Further study is necessary to establish a quantitative relationship.

22-417. Investigation of the Automatic Welding of Thin Steel Plates Under a Layer of Flux. M. R. Shraerman and B. G. Iungelson. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 3-6. (In Russian.)

Investigation to establish optimum conditions for automatic welding of thin (3 to 5 mm.) steel plates of two types. A Linde "Unionmelt" Type UM automatic welding machine was used.

22-418. Shunting of Current in Spot Welding. A. S. Gelman. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 6-10. (In Russian.)

The above phenomenon, which affects the quality of spot welding, was investigated from the theoretical point of view, and verified experimentally. Recommendations for avoidance of shunting.

22-419. Automatic Welding in Boiler Construction. I. N. Gerasimenko. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 18-19. (In Russian.)

A particular method for automatic welding of boilers used in a Soviet boiler works.

22-420. Cold Welding of Cast Iron With Combination Electrodes. P. I. Shorin. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 19. (In Russian.)

The preparation and constituents of the electrodes. Applications and advantages over other types.

22-421. A New Method for Fusing Powdered Hard Alloys Onto Irregular and Tapered Articles. A. G. Samvilov. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 20. (In Russian.)

Apparatus and technique.

22-422. New Trend in Production of "E-50" Electrodes. K. O. Kostrzhitsky and A. N. Chistoserdov. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 24. (In Russian.)

A new coating for low-carbon electrodes has been tried out with considerable success. Composition of the coating and results of testing.

22-423. A New Method for the Welding of Rail Joints. F. Wortmann. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 261-270.

A brief review of arc welding practice in Switzerland. A method which does not require any interruption of traffic, nor special tools. The joints possess high fatigue strength. Results obtained on an experimental track.

22-424. Metallic Joining of Light Alloys. (Continued.) *Light Metals*, v. 10, July 1947, p. 365-366, 367-368.

Theory and techniques for flame welding of aluminum. Special attention to fluxing problems and to gases for the fusion process. (To be continued.)

22-425. How to Obtain High Speed Production With Low Temperature Silver Alloy Brazing. A. M. Setapen. *Industry and Welding*, v. 20, July 1947, p. 26-27, 60-64.

Handling practices, heating methods, and brazing procedures.

22-426. In the Plant Weldery. Part XI. *Industry and Welding*, v. 20, July 1947, p. 30-31, 34, 36, 38.

Methods used at B. F. Goodrich Co., Akron, Ohio, for repair, maintenance, and fabrication of tire-manufacturing equipment.

22-427. Mass Production of Automotive Parts. *Industry and Welding*, v. 20, July 1947, p. 40-41, 43-44.

Welding equipment and techniques used by Allison Div., General Motors Corp., Indianapolis, Ind.

22-428. Welded Pipe Fabrication; the Multipiece Welded Turn. Arthur R. Berry. *Industry and Welding*, v. 20, July 1947, p. 46-48.

How to figure the templet angle and length of elements, how to lay out the job and square the turn, why to avoid sharp turns, and where to lay out parts.

22-429. Induction Brazing. E. H. Hulse. *Western Machinery and Steel World*, v. 38, July 1947, p. 86-87.

Methods.

22-430. Torch Brazing Aluminum. Part I. Harry A. Huff. *Western Machinery and Steel World*, v. 38, July 1947, p. 88-92.

Advantages of the process; types of aluminum successfully torch brazed; joint strength and corrosion resistance; equipment and materials required; design considerations; jigs, fixtures, and positioners; procedure; high-speed production requirements; and present and future possibilities. (To be continued.)

22-431. New Flux Makes Easier the Soldering of Zinc-Coated Parts. *Materials & Methods*, v. 26, July 1947, p. 78-79.

The good wetting action of a new, noncorrosive flux known as "Never-Sever" results in strong joints on zinc coatings.

22-432. Joining Corrosion Resistant Alloys by Submerged Melt Welding. R. J. Anderson and H. J. Roberts. *Materials & Methods*, v. 26, July 1947, p. 89-92.

Applications of Unionmelt process.

22-433. Welding Avoids Three-Month Delay in Replacing Extruding Cylinder. *Modern Industrial "Press"*, v. 9, July 1947, p. 6, 8.

Arc welding repair.

22-434. Structural Welding Research. Hugo W. Hiemke. *Western Metals*, v. 5, July 1947, p. 22-28.

Results of wartime research on welded ships. Welding research program; brittle fracture and restraint; brittle fracture and temperature; fabrication practices; effect of preheating; and residual welding stresses. 15 ref.

22-435. Safe-Ending Large Diameter Locomotive Flues. *Steel*, v. 121, July 28, 1947, p. 75.

Welding operation which combines flashing and upsetting to process some 60 flues per hr.

22-436. Practical and Economical Aspects of Furnace Brazing Processes. C. L. West. *Steel Processing*, v. 33, July 1947, p. 412-416, 423.

Design factors and methods of handling assemblies; surface conditions required; the brazing medium and its application; selection of brazing medium and flux. (To be continued.)

22-437. Improved Products by Mechanized Welding and Cutting. Earl Griffeth. *Steel Processing*, v. 33, July 1947, p. 427-430, 436.

Use in manufacture of heavy-duty earth-moving equipment.

Section 22. For additional annotations indexed in other sections, see: 3-210-227; 6-182; 9-98; 11-118; 14-209; 18-177; 19-235; 23-274-280; 24-226-228-233-239-242; 27-161.

23 INDUSTRIAL USES and Applications

23-253. Office Machine Production Simplified by Compressed-Air Operated Devices. *Steel*, v. 121, July 21, 1947, p. 110, 144.

Numerous applications of compressed air in manufacture of new type of shorthand machine by Kirk Brevitype Corp., San Diego, Calif.

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Tri-State Meeting Resumed in New Jersey With Two Technical Sessions and Dinner

Reported by Fred P. Peters

Editor-in-Chief, Materials and Methods

The traditional Tri-State Meeting of the New Jersey, New York, Philadelphia, Lehigh Valley and York Chapters—interrupted by the war—was resumed with the New Jersey Chapter as host at the Essex House, Newark. The day was packed with excellent technical papers, entertaining and informative talks by national officers of the Society, an inspirational message from one of the country's leading technical educators, and much sociability.

At the technical session in the morning three papers on new developments in steels and alloys were presented. Peter M. Payson of the Crucible Steel Co. of America described new tool and die materials and heat treatments which have brought about improvements in several metalworking operations. Francis B. Foley of the Midvale Co. (the national society's nominee for president for 1947-1948) concisely reviewed the new high-temperature materials developed for service in gas turbines and jet engines and presented an interesting theory of the means by which mechanical failures occur in this type of service. B. F. Shepherd of Ingersoll-Rand Co. (a past president of the Society) described in detail his P-V test for the hardenability of shallow-hardening steels and accompanied the lecture with a most instructive colored motion picture.

The afternoon feature was a lecture by M. A. Grossmann of Carnegie-Illinois Steel Corp. (another A.S.M. past president) on the toughness and fracture of hardened steels. Dr. Grossmann presented a brilliant analysis of the relation between heat treatment, service behavior and metallographic appearance of heat treated steels.

Bill Eisenman, the Society's national secretary, and A. L. Boegehold, national president, regaled the members and guests at luncheon and dinner, respectively, with concise reports of national headquarter's activities and of the personal vicissitudes of their travels together. The after-dinner speaker in the evening was Harvey N. Davis, president of Stevens Institute of Technology, who impressed upon all present their great responsibility as engineers to help solve the industrial and social problems that confront the world today.

The Tri-State Meeting was planned and handled by workers from all five chapters. Serving as technical chairmen or toastmasters for the day's functions were Chapter Chairmen William Klaile of New Jersey, D. E. Boyd of New York, E. A. Snader of Philadelphia, R. L. Deily of Lehigh Valley, and A. J. Kleiner of York; as well as Fred P. Peters of the New Jersey Chapter. Other members of the general committee were: D. A. Butler and J. A. Kearney of New Jersey; A. O. Crobaugh of Lehigh Valley, A. O. Schaefer of Philadelphia, and G. E. Shubrooks of York Chapter.

U. S. Heat Resisting Alloys Superior to Foreign--Evans

Reported by Louis Malpoker

Lincoln Engineering Co.

Comparing the gas turbine to a windmill and jet propulsion to a sudden deflating of an inflated balloon, C. T. Evans, Jr., chief metallurgist of the Elliott Co., presented an interesting talk on "Heat Resisting Alloys for Gas Turbines and Jet Propulsion" before the St. Louis Chapter.

A chart of the principal older alloys used in the manufacture of jet propulsion engines was shown, such as 18-8, 25-20, Inconel and others. Another slide charted the new superalloys, including the low-carbon N-155, S-590, Hastelloy B., S-816 and Inconel X. There are three types of heat resisting alloys—those which respond poorly to heat treatment, those which respond satisfactorily to heat treatment, and those which are cast.

In Mr. Evans' opinion, the heat resisting alloys of the United States are far superior to the alloys of foreign countries. Of particular interest were two slides which showed cut-away diagrams of the General Electric aircraft supercharger and of the Elliott diesel engine supercharger. The latter has seen service up to approximately 50,000 hr.

In designing high-temperature equipment the worst headache is to select heat resistant alloys which will fulfill the many and varied demands. All the necessary "evils" must be kept in mind, such as oxidation resistance, corrosion resistance, rupture resistance, creep, fatigue, temperature stability, mechanical shock resistance, forgeability and castability, machinability, weldability, reproducible properties, lack of strategic alloys, and economy.

Organize Precision Casting Firm

Walter A. Fett and M. E. Pillman have organized the Cerecast Manufacturing Co., St. Louis, Mo. Manufacturers of jewelry and precision castings for industry, the new firm claims to be the first in that part of the country using the lost wax method exclusively.

Baltimore Celebrates Anniversary

Members of the Washington and York Chapters Were Guests of the Baltimore Group at Its 25th Anniversary Celebration. The chairmen of the three chapters shown in the photo are (left to right): Carl A. Zapffe, Baltimore; A. W. Mace, Washington; and A. J. Kleiner, York

Reported by Russell L. Wilcox

Bethlehem Steel Co.

The 25th anniversary of the Baltimore Chapter was celebrated by a joint meeting with members of both the Washington and York Chapters as invited guests. The day's activities began with an inspection trip through the Rustless Division of American Rolling Mill Co. The Baltimore plant makes and rolls stainless steel exclusively.

After dinner the members heard an interesting coffee talk by Hugh Lynn Cayce, manager of the Edgar Cayce Foundation of Virginia Beach. The speaker of the evening was Baltimore Chapter's retiring chairman, Carl A. Zapffe. His remarks on "Electronic Structure of the Elements" were based upon a paper he had presented before the last National Metal Congress.

Among the guests from Washington were some of the old officers of the early days when Washington and Baltimore were a joint chapter—Messrs. Quick, Herschman and Rosenberg. Colonel Krynitzky, a charter member of the Washington Chapter for 26 years, was also present. The York delegation of 12 men was headed by Chapter Chairman A. J. Kleiner.

23-254. Doorknob Production Accelerated by Ingenious Tooling. Herbert Chase. *Iron Age*, v. 160, July 24, 1947, p. 56-61.

New setups used by Yale & Towne, including a nine-station progressive die, an assembly die, and several high-output drills and presses.

23-255. Ford Redesigns for Straightline Production of Radiators. *Automotive Industries*, v. 97, July 15, 1947, p. 45, 87.

New mass-production setup.

23-256. Australian Mosquito Production. W. Green. *Aircraft Production*, v. 9, July 1947, p. 265-266.

Assembly methods used by the de Havilland Division of General Motors.

23-257. Convair 240. G. F. Gerhauser. *Aircraft Production*, v. 9, July 1947, p. 258-264.

Use of fixtures built in master tooling dock for production of American plane.

23-258. Timken Roller Bearings on Union Pacific Stock Cars. *Railway Mechanical Engineer*, v. 121, July 1947, p. 351-353.

Application.

23-259. Making Small Automatics. *Machinery (London)*, v. 70, June 26, 1947, p. 673-683.

Methods used by British firm.

23-260. The Use of Die Castings in a Film Strip Projector. N. Field. *Machinery (London)*, v. 70, June 26, 1947, p. 689-692.

Describes and illustrates this application.

23-261. Problems Involved in the Fabrication of High-Temperature Alloys. Gunther Mohling. *American Iron and Steel Institute Preprint*, 1947, 7 p.

A general discussion concerned with that group which exhibits superior strength in the temperature range of about 1200 to 1500° F., especially those developed by Allegheny Ludlum Steel Corp.

23-262. Aluminum Backed Phosphor Screen in Cathode Ray Tubes. Arthur Bramley. *The Electrochemical Society Preprint 91-30*, 1947, 4 p.

An evaluation of the different processes pertinent to the operation of the aluminum-backed cathode-ray tube. Results support the contention that reflection from the aluminum is the major contributor of additional light intensity.

23-263. Some Applications of Tantalum in Electronics. L. F. Yntema and R. W. Yancey. *The Electrochemical Society Preprint 91-33*, 1947, 4 p.

23-264. Quelques Applications des Demi-Produits a Section Variable dans l'Aéronautique. (Several Aeronautical Applications of Semifinished Products Having Variable Sections.) Jean Guillemin. *Revue de l'Aluminium*, v. 24, March 1947, p. 79-83.

The application of semifinished light alloy products having variable cross sections and different shapes is proposed for the aircraft industry (light private planes).

23-265. L'Aluminium et les Conserves Alimentaires. (Aluminum and Canned Foods.) Rene Chevillotte. *Revue de l'Aluminium*, v. 24, March 1947, p. 100-108.

The use of aluminum for cans, stressing its advantages over other metals. Numerous foods may be canned in aluminum.

23-266. Tube-Bending Tool and a Hand Tool for the Determination of Length of Rivets for Various Types of Rivet Heads. *Headquarters Air Materiel Command, Wright Field, Translation F-TS-1915-RE*, May 1947, 3 p.

(From report of *Junkers Flugzeug- und Motorenwerke A. G., Dessau, Germany.*)

23-267. Requirements of Steel for Gas Turbines. H. R. Zschokke and K. H. Niehus. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 271-283.

Steels used for military-aircraft gas turbines need only have a life of a few hundred hours, while many years' life is required for the turbines built for most peacetime uses.

23-268. Notes on Use of Aluminum in Domestic Gas Equipment. *Light Metals*, v. 10, July 1947, p. 319-321.

Applications illustrated and discussed.

23-269. Aluminum and Magnesium in the Electrical Industries. B. J. Brajnikoff. *Light Metals*, v. 10, July 1947, p. 325-332.

The construction and operation of high-voltage electrostatic generators.

23-270. International Magnesium Congress. (Concluded.) *Light Metals*, v. 10, July 1947, p. 333-335.

The future of ultralight-alloy applications and production costs.

23-271. Light Alloys in the Internal-Combustion Engine. (Continued.) *Light Metals*, v. 10, July 1947, p. 369-375.

The significance of weight reduction on static and dynamic characteristics and the use of aluminum alloy pistons. (To be continued.)

23-272. Placer Mining Dredges. Ralph G. Paul. *Western Machinery and Steel World*, v. 38, July 1947, p. 78-81, 112.

Manufacture of the above by Yuba Mfg. Co., Benicia, Calif.

23-273. San Francisco Locomotive Works. *Western Machinery and Steel World*, v. 38, July 1947, p. 82-85.

Production of model locomotives.

23-274. Giant Tools for the Pulp Industry. *Western Machinery and Steel World*, v. 38, July 1947, p. 110-111.

Production of pulp mill-chippers. Operations include forging, flame cutting, and machining.

23-275. Castings to Stampings. D. A. Rogers. *Modern Industrial "Press"*, v. 9, July 1947, p. 28.

Outlines above change in production of an adjustable magnifying glass.

23-276. Aircraft Industry One of Largest Users of "Rigid-Tex". E. Weller. *Modern Industrial "Press"*, v. 9, July 1947, p. 42, 44.

Applications of new process for imprinting various patterns into metal, thus permitting use of lighter gage materials than would otherwise be necessary. It is applicable to both sheet and strip, ferrous or nonferrous. Another advantage is resistance to marring.

23-277. Characteristics of the Jacketed Steel Drier Roll. George L. Snyder. *Paper Mill News*, v. 70, July 1947, p. 74, 76, 78, 80-81.

Properties and designs of the rolls made by Lukens Steel Co.

23-278. Rhapsody in Motor Speeds; Building U. S. Varidrives in Los Angeles. Gordon B. Ashmead. *Western Machinery and Steel World*, v. 38, July 1947, p. 74-76, 109.

Methods used by U. S. Electrical Motors, Inc.

23-279. New Alloy Discovery Brings Supersonic Flight Nearer. Donald Stokes. *Western Machinery and Steel World*, v. 38, July 1947, p. 100-101.

Production and development of "Nimonic 80" in Britain.

23-280. Steel for Farm Buildings. *American Lumberman & Building Products Merchandiser*, July 19, 1947, p. 56-57.

New type of farm-building construction developed by Carnegie-Illinois Steel Corp., known as site-welded construction.

23-281. Type and Mats Eliminated in Rotary Press Printing. Jerry Walker. *Editor & Publisher*, v. 80, July 19, 1947, p. 5, 54, 56.

How Florida weekly has eliminated line casting from molten metal and plate making from matrices. Engraved magnesium plates are used on either rotary or flatbed presses. I.B.M. electromatic proportional spacing typewriters are used for the copy, which is then photo-engraved.

23-282. Huge Placer Dredges. *Steel*, v. 121, July 28, 1947, p. 90, 92.

216-ft. welded "digging ladder", and 14-cu.ft. Mn steel buckets used to excavate tin-bearing sand and gravel.

Section 23. For additional annotations indexed in other sections, see: 3-210-224-226-227-230-243-256-257-261; 6-194-221; 12-149-161; 14-234; 19-257-264; 22-372-437; 24-236-250-251-252; 25-104.

24 DESIGN

24-225. Progress in the Design of Elevated Steel Tanks. Donald A. Leach. *Journal of the American Water Works Association*, v. 39, July 1947, p. 651-658.

Illustrated.

24-226. Welding Couplings With Channels for Hydraulic Testing of Joints. A. I. Kratman. *Avtogennoe Delo (Welding)*, no. 1, 1947, p. 30. (In Russian.)

Design arrangement for this type of test. It is especially useful for determining the quality of welds in high-pressure vessels.

24-227. Several New Problems in Structural Mechanics of Shells and Thin-Wall Construction. V. Z. Vlasov. *Bulletin of the Academy of Sciences of U.S.S.R. (Section of Technical Sciences)*, no. 1, 1947, p. 27-52. (In Russian.)

New theory, which is developed mathematically, permits solution of complicated problems in thin-wall construction. Application to ship building and to aircraft wing structures. 10 ref.

24-228. Eine Neue Ausfuhrung der Abzweigrohre von Druckleitungen. (A New Design for Branching Pipes for High-Pressure Applications.) E. Schmidt. *Schweizer Archiv*, v. 13, no. 5, 1947, p. 141-147.

Strengthening the parts of branching high-pressure pipes which are most subject to wear, by welding on additional sheet. A standard for measurements has been set up on the basis of pressure tests on two model pipes.

24-229. Equivalent Spur and Helical Gears. Carl A. Johnson. *Machine Design*, v. 19, July 1947, p. 155.

Table facilitates replacement of spur by helical gears. One to seven choices of standard, normal diametral pitch and helix angle which will produce a helical gear with a standard diametral pitch in the plane of rotation the same as that of the spur gear replaced.

24-230. Fundamentals of Machine Design Engineering. D. V. Waters. *Tool Engineer*, v. 18, July 1947, p. 23-28.

A few of the engineering fundamentals which underlie all successful machine designs and some mechanisms which illustrate these principles.

24-231. Mechanical Testing. Part II. A Review of Methods of Structure-Loading. E. R. Arbon. *Aircraft Production*, v. 9, July 1947, p. 267-269.

24-232. Pattern Development of Sheet Metal Structures for Vitreous Enameling. W. Cookson. *Sheet Metal Industries*, v. 24, July 1947, p. 1389-1394, 1404.

Procedures for templet development and design. 12 ref.

(Turn to page 60)

NATIONAL MEETINGS

for October

Oct. 2-3—Gray Iron Founders' Society. 19th Annual Meeting, Schroeder Hotel, Milwaukee. (R. L. Collier, executive vice-president, 1010 Public Square, Cleveland 13.)

Oct. 2-4—Society of Automotive Engineers. Autumn Aeronautic Meeting, Biltmore Hotel, Los Angeles. (John A. C. Warner, secretary, 29 West 39th St., New York 18.)

Oct. 9-10—Porcelain Enamel Institute. Ninth Annual Meeting, Cleveland.

Oct. 10-11—Refractories Division of the American Ceramic Society. Fall Meeting, Bedford Springs Hotel, Bedford, Pa. (Collin Hyde, Harbison-Walker Refractories Co., Hays Laboratory, Pittsburgh 7.)

Oct. 15-18—Electrochemical Society. Fall Congress, Copley-Plaza Hotel, Boston. (Colin G. Fink, secretary, 3000 Broadway, New York 27.)

Oct. 18-24—National Metal Congress and Exposition, International Amphitheatre and various hotels, Chicago. (See pages 5, e.s., of this issue for details of meetings.)

Oct. 21-25—American Chemical Society. Pacific Industrial Conferences and Pacific Chemical Exposition, Civic Auditorium, San Francisco. (Robert Matteson, chairman of the California Section, Hotel Whitcomb, San Francisco 1.)

Oct. 30-31—Division of Industrial and Engineering Chemistry, American Chemical Society, in cooperation with National Research Corp. High Vacuum Symposium, Hotel Commander, Cambridge, Mass. (Stanley Heck, secretary, National Research Corp., Cambridge 42, Mass.)

Oct. 30-Nov. 1—American Society of Tool Engineers. 15th Semi-Annual Meeting, Statler Hotel, Boston. (Harry E. Conrad, executive secretary, 1666 Penobscot Bldg., Detroit 26, Mich.)

Movie Explains R.F. Heating

Principles and applications of radio frequency heating in industry are explained in a new 16-mm. sound motion picture filmed by Westinghouse. The movie is about 40 min. long, and divided into two parts, one on induction heating and the second on dielectric heating. The film is available without charge from the Film Section, Westinghouse Electric Corp., 511 Wood St., Box 868, Pittsburgh 30, Pa.

New Company Formed

A new company known as Redhard Metals, Inc., has been recently organized in Hatboro, Pa., to deal in metals to resist heat, wear and corrosion; cutting tools; precision castings; high-temperature alloys; metal forming and finishing. Charles V. Schuyler is president and Henry B. Rebmann is secretary and treasurer.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Oct. 8	Akron Elks Club	A. E. Focke	Metallurgy and Its Application to Industry
Baltimore	Oct. 16	Engineers' Club	R. W. Emerson	Metallurgy of Welding Air-Hardening Steels and Corrosion Resistant Steel Piping
Boston	Oct. 3	Hotel Sheraton	A. H. d'Arcambal	Materials for Precision Cutting Tools and Gages
Buffalo	Oct. 9	Hotel Statler		
Calumet	Oct. 14	Phil Smidt's, Hammond, Ind.	Harold K. Work	Research in Steel Working
Cincinnati	Oct. 9	Engineering Society	D. Hastie	Grinding
Cleveland	Oct. 6	Cleveland Club	Geo. A. Roberts	Toolsteels
Dayton	Oct. 8	Biltmore Hotel	D. Hastie	Grinding
Denver Group	Oct. 17	Oxford Hotel	Samuel Epstein	Aging of Iron and Steel
Eastern N.Y.	Oct. 14	Holland Inn	J. C. Harris	Cleaning of Metals
Fort Wayne	Oct. 13	Chamber of Commerce	F. G. Outcalt	Unionmelt Welding
Georgia	Oct. 13	Atlantic Steel Co.	C. R. Freberg	Research Serving Southern Industry
Hartford	Oct. 14	Hartford Trade School	L. E. Gippert	Toolsteel Metallurgy
Indianapolis	Oct. 27	Marott Hotel	John Wulff	Modern Theory and Practice in Cold Working
Lehigh Valley	Oct. 6	Hotel Traylor	Peter Payson	T-T-T Curve as a Guide to the Heat Treatment of Steel
Los Angeles	Oct. 23	Southern Calif. Gas Co.	Fred Robbins	Heat Treatment of Steel for Machinability
Mahoning Valley	Oct. 21	V.F.W. Hall, Youngstown	G. Comstock	Powder Metals
Manitoba	Oct. 9	Marlborough Hotel, Winnipeg	E. E. Thum	Political, Social and Industrial Implications of Atomic Energy
Mich. Col. M. & T.	Oct. 14	M.C.M.T. Clubhouse	James Foley	The Wire Industry
Milwaukee	Oct. 14	City Club of Milwaukee	E. S. Roland	Research in Metallurgy
New Haven	Oct. 30	New Haven	F. L. LaQue	Corrosion
New Jersey	Oct. 27	Essex House, Newark	H. J. French	Alloy Steels and Their Heat Treatment
New York	Oct. 3	Building Trades Bldg.		Smoker
Northwestern Pa.	Oct. 30	Titusville	H. E. Replogle	Alloy Toolsteels
Notre Dame	Oct. 8		A. L. Feild	Stainless and Heat Resisting Alloys
Ontario	Oct. 3	Hamilton, Ont.	Francis B. Foley	Steel
Oregon	Oct. 17	Congress Hotel, Portland	Burton L. Hazen	Metal Spraying
Philadelphia	Oct. 31	Engineers' Club	Henry M. Heyn	Controlled Atmospheres
Pittsburgh	Oct. 9	Mellon Inst. Auditorium	C. L. Altenburger	Metallurgy of Cold Reduced Sheets
Pueblo Group	Oct. 16	Minnequa University Club	Samuel Epstein	Aging of Iron and Steel
Puget Sound	Oct. 15	Washington Athletic Club	A. J. Langhammer	Powdered Metals
Rhode Island	Oct. 1	Revere Brass & Copper Co., Inc., New Bedford, Mass.	James A. Green	(Plant visitation)
Rochester	Oct. 13	Powers Hotel	Peter Payson	T-T-T Curve as a Guide to the Heat Treatment of Steel
Rome	Oct. 6			High Frequency Brazing
Saginaw Valley	Oct. 14	Fischer's, Frankenmuth	T. W. Lippert	(General interest subject)
St. Louis	Oct. 17	York Hotel	Oscar Frohman	Modern Engineering Bronzes and Their Use in Industry
San Diego	Oct. 16	San Diego Hotel	Ray Rankin	Problems of Streetcar and Bus Maintenance
Springfield	Oct. 13	Springfield, Vt.	R. G. McElwee	Specification and Application of Cast Iron
Terre Haute	Oct. 13	I.S.T.C. Student Union	A. E. Focke	The Metallurgist, the A.S.M. and the Metal Industry
Texas	Oct. 7	Ben Milam Hotel, Houston	H. H. Harris	Use and Manufacture of Heat Resisting Castings
West Michigan	Oct. 20	Rowe Hotel, Grand Rapids		Die Design
Western Ontario	Oct. 10	Hotel London, London	G. S. Farnham	Stainless Steel
Worcester	Oct. 8	Marlboro Country Club	Geo. A. Roberts	Practical Hints on Heat Treatment of High Speed Steels

24-233. Arc Welded Fabrication is Lowering Cost, Extending Life of Modern Valves. Hugo H. Stahl. *Welding Journal*, v. 26, July 1947, p. 620-621.

An all-welded small-size valve body, gate type, for high-pressure service developed by Manning, Maxwell and Moore, of Boston, Mass., is offered in support of the contention that a weldment can compete with small-sized intricate casting on a cost basis, even on a mass production basis.

24-234. Converting Partial Rotary to Sliding Motion. I. Cohen. *Machinery (London)*, v. 71, July 3, 1947, p. 17.

A device in a change gear mechanism to operate a sliding fork by means of a lever in a plane at right angles to path of fork.

24-235. Compressed Air Clamping Device. *Machinery (London)*, v. 71, July 3, 1947, p. 20.

Construction and advantages of the device.

24-236. Proper Use of Spring Materials. F. P. Zimmerli. *Society of Automotive Engineers, Inc., Preprint*, 1947, 18 p.

The properties and applications of the various spring designs and materials, not only body-suspension springs, but all other types of ferrous and nonferrous springs.

24-237. The High-Pressure Gasholder. M. Noone and A. G. Grant. *Institution of Gas Engineers, London, Copyright Publication No. 314*, 1947, 27 p.

Design and construction of high-pressure gasholders. Requirements of welded construction. Chart shows dimensions for a wide range of capacities and pressures.

24-238. Charts for the Minimum-Weight Design of Multiweb Wings in Bending. Evan H. Schuette and James C. McCulloch. *National Advisory Committee for Aeronautics Technical Note No. 1323*, June 1947, 39 p.

A method for calculation of the buckling stress in a multiweb wing in bending and design charts based on this method for the minimum-weight design of multiweb wings of 24S-T aluminum-alloy sheet, extruded 75S-T aluminum alloy, and extruded O-IHTA Mg alloy.

24-239. Assembly and Welding of a Spherical Regeneration Tank 12.98 Meters in Diameter. E. D. Lonsky. *Avtogennoe Delo (Welding)*, no. 2, 1947, p. 11-16. (In Russian.)

Several diagrams and photographs.

24-240. Some Investigations of the General Instability of Stiffened Metal Cylinders. Part VIII. Stiffened Metal Cylinders Subjected to Pure Torsion. Louis G. Dunn. *National Advisory Committee for Aeronautics Technical Note No. 1197*, May 1947, 51 p.

Details of research conducted at California Institute of Technology using a combined bending and torsion machine and wire strain-gage equipment.

24-241. Brittle Lacquer Stress Analysis. Part I. E. Barber. *Engineering Materials*, v. 5, June 1947, p. 59-61.

Outlines the method. (To be concluded.)

24-242. Welding for Economy, Flexibility, Appearance. Part II. Textile Machine. C. A. McClean. *Industry and Welding*, v. 20, July 1947, p. 28-29, 73-75.

Principles demonstrated can be applied to many types of machinery. Cutting and welding have reduced weight 45%, increased strength, and eliminated machining, drilling, milling, and grinding operations. Stainless steel rolls have replaced copper-plated black iron rolls; and bearing housings, formerly cast, are now flame cut and arc welded.

24-243. Designing of "Trouble-Free" Dies. Part LXXI. Assembling Sheet Metal Parts. C. W. Hinman. *Modern Industrial "Press"*, v. 9, July 1947, p. 20, 22.

24-244. The Design of Compound Cylinders for High-Pressure Service. *Engineering*, v. 164, July 4, 1947, p. 16.

T. McLean Jasper discusses W. R. D. Manning's paper in May 2 issue, presenting theories and information based on his experiences, concerning failure of metals.

24-245. Does Torque Weaken Bolts? H. O. Hill. *Engineering News-Record*, v. 139, July 24, 1947, p. 78-79.

Tests made on bolts show that full strength in tension is retained, even when torque is applied, unless the torque loading is carried to bolt failure. (Reprinted from *Fasteners*.)

24-246. Forging Die Design. John Mueller. *Steel Processing*, v. 33, July 1947, p. 424-426, 430, 436.

The die block and its preparation for use.

24-247. Photo-Projection Inspection and Layout. C. J. Kettler. *Iron Age*, v. 160, July 31, 1947, p. 45-49.

A new, simple, and rapid method of inspecting and laying out intricate castings involves the accurate projecting of layout drawings by optical means onto the surface of a casting.

24-248. How to Design Carbide Draw Dies. Earle Glen. *American Machinist*, v. 91, July 31, 1947, p. 101-103.

Types of draw die nibs. Dimensions depart somewhat from those of steel dies. Manufacturing tolerances; steps in assembly; shrink fit allowances.

24-249. Crankshaft Bending Vibration. E. Forest Critchlow and W. T. Bean, Jr. *SAE Quarterly Transactions*, v. 1, July 1947, p. 380-388.

Improper evaluation of bending vibration during endurance tests is reported to be the cause of most of the recent crankshaft failures occurring during flight in low-horsepower engines. A simple bending pickup device is suitable for studying crankshaft bending vibration qualitatively; good agreement with results from strain-gage equipment.

24-250. Philosophy for Design of Sandwich-Type Structure. John F. Korsberg. *SAE Quarterly Transactions*, v. 1, July 1947, p. 408-414.

Preprint previously abstracted.

24-251. Experiences of an Aircraft Manufacturer With Sandwich Material. *SAE Quarterly Transactions*, v. 1, July 1947, p. 415-428.

Preprint previously abstracted.

24-252. Sandwich Materials: Metal Faces Stabilized by Honeycomb Cores. W. W. Troxell and H. C. Engel. *SAE Quarterly Transactions*, v. 1, July 1947, p. 429-440.

Preprint previously abstracted.

24-253. Metallurgical and Structural Investigation of Steel Castings for Aircraft. L. W. Smith and L. D. Morris. *Transactions of American Society for Metals*, v. 38, 1947, p. 848-874; discussion, p. 874-878.

Program included determination of chemical and physical properties, determination of quality by various inspection methods, proof testing, fatigue and repeated load cycling, and static ultimate tests. Results indicate that sound castings can be obtained and that they can be used in aircraft primary structures to supplement and supersede present components.

24-254. Column Characteristics of Sandwich Panels Having Honeycomb Cores. W. W. Troxell and H. C. Engel. *Journal of the Aeronautical Sciences*, v. 14, July 1947, p. 413-420; discussion, p. 420-421.

The column characteristics of panels having metal faces and honeycomb cores. Compressive behavior is determined by the elastic properties of the face metal and by the shear rigidity of the stabilizing medium. Comparison of honeycomb panels with all-metal construction shows the sandwich to be the less efficient simple column.

24-255. High-Speed Compression Tests on Copper. M. Greenfield and E. T. Habib. *Journal of Applied Physics*, v. 18, July 1947, p. 645-650.

Dynamic shortening of ½-in. length copper cylinders is achieved by striking them with a hardened steel projectile at high velocities. The average strain rate was about 1200 per sec. Energy per unit volume absorbed by the copper is plotted against strain. A true stress logarithmic strain curve is computed. This curve is compared with a similar curve derived from high-speed tests on copper in tension.

Section 24. For additional annotations indexed in other sections, see: 3-203-209-210-215-218-227-255; 9-88; 14-204-223-226; 19-260; 20-407-421-426; 22-400-408-409-410-434; 23-264-277; 27-153-155-156.

25 MISCELLANEOUS

25-103. Steel Plant and Foundry Application of Mercury Arc Rectifiers. S. R. Durand. *Steel*, v. 121, July 14, 1947, p. 102, 104, 107, 136.

Types used. Advantages and disadvantages compared with motor-generator sets.

25-104. Metallurgical Topics. *Engineer*, v. 183, June 27, 1947, p. 562-563.

Review of a paper by Hermann Kästner (*Stahl und Eisen*, Jan. 2, 1947, p. 10-19) which described a new continuous casting process for nonferrous alloys and indicated its possibilities for steel casting; a discussion of a French paper on cementation by beryllium; and a review of a Belgium conference on new applications of the rare metals.

25-105. Steam Turbines for Iron and Steel Works. I. V. Robinson. *Blast Furnace and Steel Plant*, v. 35, July 1947, p. 842, 844-846, 848.

Power stations for iron and steel works are increasingly efficient. Working pressures and temperatures of various installations. Capacities of turbines, types of condensers in use. (Paper read before British Iron and Steel Institute. To be continued.)

25-106. Making the Foundry a Good Place to Work. *American Foundryman*, v. 12, July 1947, p. 40-43.

Recommended layout and also a health program. (Condensed from paper by L. W. Woodhouse presented at 1947 New England Foundry Conference.)

25-107. Foundry Costs and Cost Controls. C. E. Westover. *American Foundryman*, v. 12, July 1947, p. 44-48.

Method based on financial and control budgets.

25-108. Tomorrow's Metallurgy. Fred P. Peters. *Scientific American*, v. 177, Aug. 1947, p. 56-58.

Future prospects.

25-109. Review of the Swiss Metal and Engineering Industries. W. M. von Orelli. *Journal of the Iron and Steel Institute*, v. 156, June 1947, p. 145-154.

Persons in chief industries. Resources in iron ores and coal. Development of metal and engineering industries. Iron and steel, alloy steel,

(Turn to page 62)

Case Establishes New Research Laboratory

A new research laboratory recently established at Case Institute of Technology has been named the research laboratory for mechanical metallurgy; it occupies the newly constructed third floor of the Rockefeller Metallurgical Engineering Building on the Case campus. George Sachs, professor of physical metallurgy and internationally known for his work on the plastic flow of metals, residual stresses and X-rays, has been appointed director of the laboratory.

Problems on which the laboratory group is working at present include flow and fracture of metals, analysis of various metal forming and joining processes, stress and strain analysis, heat treatment of steels, and metal casting. Among the governmental agencies for which research projects are being carried out are the Office of Naval Research of the U.S. Navy, the Army Ordnance Department, the Committee on Ship Construction of the National Research Council, and the National Advisory Committee for Aeronautics.

EMPLOYMENT SERVICE BUREAU

The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad will be printed. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, Ohio, unless otherwise stated.

POSITIONS OPEN

East

FURNACE ERECTION SUPERINTENDENT: Exp. in all types of heat treating furnaces. Exp. men for estimating and designing furnaces and ovens. W. S. Rockwell Co., 200 Eliot Street, Fairfield, Conn.

TEACHER: For met. eng. courses. Permanent position for the right man. Consideration will be given man with B.S. degree in eng. with industrial exp. in met. eng., or one with B.S. in met. eng. who has had teaching exp., or one with a B.S. in met. or chem. eng. plus an advanced degree. Box 9-5.

HEAT TREAT: Shop executive for planning and supervision of large heat treating plant handling great variety metals and parts. Philadelphia area. Must have good technical knowledge and broad practical exp. Excellent opportunity for advancement for really capable man. State qualifications fully and starting salary desired. Box 9-120.

RESEARCH METALLURGIST: Senior research metallurgist desired for high temperature met. program in a new field of investigation. Recent Ph.D. or equivalent in research endeavor essential. Salary commensurate with qualifications and exp. Cornell Aeronautical Lab., Employment Office, Buffalo 21, N. Y.

SALES ENGINEER: Grad. engineer, not over 35 yr., to represent manufacturer in sale of lab. and precision equipment. Previous exp. desired in sale of allied equipment or lab. use of materials testing devices. Box 9-125.

Midwest

X-RAY: Research asst., grad. physicist, physical metallurgist or physical chemist, for full-time work in the field of X-rays, crystal structure and related problems in physics of metals. Opportunity for tuition-free advanced study in night school. Give full qualifications and salary required in letter. Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh 13, Pa.

METALLURGISTS, PHYSICISTS: Qualified to conduct research in any of the following fields with particular emphasis on high-temperature materials—physics of solids, experimental alloy development, crystal structure investigations, microconstituent research, and ceramics. Good knowledge of fundamentals and background of graduate study are especially desired. Salary commensurate with recognized qualified exp. Box 9-10.

ENGINEER AND PRODUCTION MANAGER: For well-established and incorporated midwest fabricator of low-carbon wire and metal. Should understand electronic timing for welders and production methods for resistance welding; also handle tool design and estimating. Substantial salary and bonus, with privilege of investment, if desired. Box 9-155.

West Coast

RESEARCH METALLURGIST: For new research unit of large fabricator of light metal alloys. Excellent opportunity for right individual to grow with the organization. Principal qualifications required consist of broad training in physics and physical chemistry of metals. Exp. with aluminum alloys is desirable but not essential. Box 9-15.

X-RAY SPECTROGRAPHER: Wanted by research division of a large manufacturer of nonferrous metals and alloys. Candidate should have sound training in physical metallurgy and qualifications necessary to perform or supervise all functions of an X-ray diffraction laboratory. Box 9-20.

METAL FINISHING SPECIALIST: To handle research and development for a large fabricator of light metal alloys. Broad exp. in electroplating and a working knowledge of the paint, enamel and ceramic finishes commonly used on metals. Box 9-25.

South

PLANT METALLURGIST: College grad. Nonferrous metallurgist for bronze and aluminum foundry making sand castings with at least 5 yr. nonferrous exp. Age 25 to 35. Duties require research, fdry. procedure and supervision of routine testing. Box 9-130.

POSITIONS WANTED

MATERIAL INSPECTION or PHYSICAL LABORATORY: Familiar with physical testing and inspection of iron and steel castings—boiler, firebox, plate, alloy and stainless tubing, diesel engine parts, spring steel, all rolled products. Exp. in metallography and heat treating. Knowledge of most physical testing equipment. 26 yr. exp. Box 9-30.

METALLURGIST: B.S. in met. Married. Steel mill exp. plus 7 yr. varied lab. and plant control work on selection, welding, and heat treatment of carbon and alloy steels. Interested in met. development or production work primarily in ferrous field. Box 9-35.

METALLURGIST: Age 31, married, one child. 10 yr. exp. from acid and basic openhearth to acid electric melting. Also exp. in steel fdry. sand control, heat treating, physical testing, metallography, radiography. Prefers the Midwest. Box 9-40.

WELDING ENGINEER: Age 31, B.S. degree, 11 yr. exp. with light and heavy materials, mild, low alloy steels, stainless, aluminum. Extensive knowledge of welded design, shop production installations. Complete familiarity with equipment for manual, automatic welding and cutting, inert-gas welding, testing, inspection, and research. Box 9-45.

FORGE SHOP FOREMAN OR SUPERINTENDENT: 30 yr. exp. in forging. 22 yr. in supervision as foreman, general foreman and superintendent in railroad and jobbing shops. Understands forging procedure on flat and closed die operations, annealing, normalizing, and heat treating of the various types of steel. Cost conscious, likes responsibility, and capable of getting production. Box 9-50.

METALLURGICAL SALES EXECUTIVE: Grad. mech. eng. Steel mill met. exp. 15 yr. in sales promotion, training, advertising and executive capacity. Successful sales record in met. products, and stainless and high temperature alloy castings. Best references. Box 9-55.

METALLURGIST: Melting supervisor. College grad, 1935. Married, age 33. Exp. melter in electric arc and induction furnaces for castings and ingots by acid and basic methods in 2-lb. to 70-ton heats of carbon, medium and high-alloy steel. Research and production exp. in melting and metallography. Box 9-60.

HEAT TREAT SUPERVISOR: 10 yr. general heat treating. Specializing in high speed steels. Desires position with chance for promotion. Box 9-65.

RESEARCH-DEVELOPMENT ENGINEER: A.B. in physics. Exp. in arc and resistance welding (ferrous and light alloys), metal forming, physical testing, and manufacturing process development. Some met. exp. 7 yr. with one company as research engineer, 3 supervisory. Age 30, married. Desires responsible position in industrial lab., near university or technical institute. Box 9-70.

FOUNDRY SUPERINTENDENT: Age 42, married. 10 yr. asst. superintendent in secondary aluminum and nonferrous ingot production. 5 yr. as superintendent of aluminum ingot casting company. Good organizer and capable of negotiating difficult union contracts satisfactorily. Box 9-75.

STAINLESS STEEL METALLURGIST: Desires reponsible position with progressive firm. Age 36, grad. met. 9 yr. exp. in manufacture and fabrication of stainless bar, wire, and sheet. Also, 3 yr. with plain carbon, alloy and high speed steel; 2 yr. with brass and bronze alloys. Box 9-80.

RECENT METALLURGICAL GRADUATE: Desires position with fdry. Single, age 27. Location immaterial. Box 9-85.

ALLOY CASTING REPRESENTATIVE: Contacts with Pittsburgh-district furnace builders; wishes to represent alloy fdry. and fabricator. Box 9-90.

METALLURGIST: College grad. Age 52. Exp. in shop production problems, heat treat, testing, inspection, control of materials, material specifications, metallography and welding. Desires responsible position in development or production with responsible company with future. References upon request. Box 9-95.

EXECUTIVE ENGINEER: Age 37, with thorough management, eng., and mfg. background. Diversified exp. in all phases of operation—eng., research and development, met., welding eng., production eng., production control, industrial eng., factory cost, plant eng. and purchasing. Ability to carry complete eng. and mfg. responsibility. Invites correspondence. Box 9-100.

METALLURGIST: B.S. chem. eng.; age 29, married. 6 yr. exp. E.F. alloy steel; quality control, heat treating, supervisor physical testing laboratory, sales orders and specification. 2 yr. exp. sales engineer. Desires position in sales or production, domestic or foreign service. Box 9-105.

METALLURGIST: College grad.; married, age 29. 5 yr. exp. in nonferrous fabrication. All methods of casting, forging, extruding, rolling, refining, continuous oven brazing and welding. Materials testing, plant and equipment layout, methods and standards, material handling, product design and development, tool room and machine shop practice. Box 9-110.

MECHANICAL AND METALLURGICAL ENGINEER: B. of Mech. Eng. Married, age 32. Formerly research and development engineer with Canadian physical metallurgy research laboratories, consultant and research engineer to Canadian Industry and War departments. Research in stress analysis, fatigue problems, design of structures, development of projectiles. Has been managing and supervising dry cleaning establishment for past two years, but wishes to get back into engineering field. Box 9-115.

FOUNDRY EXECUTIVE: 15 yr. exp. Complete knowledge of stainless steel casting production. Excellent record. Seeks connection with company producing castings exclusively. Will travel; location immaterial. Presently employed. Box 9-135.

INDUSTRIAL ENGINEER: Desires position with fast growing concern. 8 yr. exp. in time and motion study, job description, evaluation and classification, purchasing, planning and scheduling, methods and routings. References. Free to travel. Age 36. Box 9-140.

METALLURGIST: Grad. met. eng. Over 10 yr. exp. in metallographic investigations, testing, control, heat treating and research in wrought and cast steels, gray iron and malleable. Desires responsible permanent position with progressive manufacturing concern or fdry. Box 9-145.

HEAT TREAT SUPERVISOR: Age 40. 4 yr. exp. in hardening precision gears, tools and dies. Knowledge of carbon, alloy, stainless and high speed steels. Familiar with production heat treatment methods including normalizing, carburizing and cyaniding. Chicago or New Mexico preferred. Box 9-150.

pig iron, coal, electricity and manufacturing during World War II. Present-day problems. 14 ref.

25-110. New Metals for Old. Edward Appleton. *Foundry Trade Journal*, v. 82, June 26, 1947, p. 185-192.
Developments of past 50 years.

25-111. Screw Machine Engineering Data Sheet. *Screw Machine Engineering*, v. 8, July 1947, p. 53-54.
Weight tables for rounds and hexes in steel, brass, and aluminum; conversion factors for common alloys of the above, and for squares and octagons; and a table for material loss on cutting.

25-112. Standardized Handling Methods and Layout Integrate Material Movement. Floyd E. Bliven. *American Machinist*, v. 91, July 31, 1947, p. 78-82.
Methods used at General Electric's Erie works.

25-113. Nonferrous Metallurgy. J. C. Chaston. *Metal Industry*, v. 71, July 11, 1947, p. 28-30.
Review of a century of British progress.

25-114. Common User Research. *Metal Industry*, v. 71, July 11, 1947, p. 33.
Fulmer Research Institute, a new British metallurgical laboratory.

25-115. Industrial Research. *Product Engineering*, v. 18, Aug. 1947, p. 131-132.
Research by the railroads and by the automotive industries. (From "Research in the Mechanical Industries" by J. F. Wilkes presented before the Chicago Production Conference.)

25-116. Planning a Toolroom Heat Treating Department. Part II. R. C. Gnan. *Iron Age*, v. 160, Aug. 7, 1947, p. 70-77.
Importance of utilizing proper and up-to-date accessory equipment if best results are to be attained. Recommended layouts. (Concluded.)

Section 25. For additional annotations indexed in other sections, see:
22-425.

26 STATISTICS

26-101. European Aid Program Would Boom American Steel Rate Next Year. Jack R. Hight. *Iron Age*, v. 160, July 17, 1947, p. 95-98.
Effects of Marshall plan.

26-102. Electrolytic Tin-Plate Output Seen Passing Hot Dipped This Year. Tom Lloyd. *Iron Age*, v. 160, July 17, 1947, p. 100-102.
Present trends and future prospects.

26-103. Beryllium Production and Use Continues to Expand. Walter Janssen. *Domestic Commerce*, v. 35, July 1947, p. 49-52.
Production, price, and use trends.

26-104. Manufacture of Aluminum From Clay Developed by Standards. *Domestic Commerce*, v. 35, July 1947, p. 39-42.
Economic significance and future prospects for the acid and the alkaline-extraction processes.

26-105. Production Costs Under Premium Price Plan. Jesse L. Maury. *Engineering and Mining Journal*, v. 148, July 1947, p. 86-87.
The principal elements of production, costs, income, and operating margins of various groups of lead, zinc, and copper mines reporting under the Premium Price Plan.

26-106. Technology Will Solve Our Iron-Ore Problems. Carl Zapffe. *Engineering and Mining Journal*, v. 148, July 1947, p. 88-90.
Manager, Iron-Ore Properties, Northern Pacific Railway, Brainerd, Minn., takes an optimistic viewpoint.

26-107. The Iron Ore Resources of Minnesota. Elting H. Comstock. *Skillings' Mining Review*, v. 36, July 19, 1947, p. 1-2, 4, 13.
An address.

26-108. America Needs a Million Tons of Copper. C. Donald Dallas. *Scientific American*, v. 177, August 1947, p. 52-55.
Chairman of Board of Revere Copper and Brass presents case for a copper stockpile.

26-109. Aluminum Industry in Hungary. A. Domony and E. Koves. *Light Metals*, v. 10, July 1947, p. 352-364.
A broad review of the growth and present status of the Hungarian aluminum industry, emphasizing domestic applications.

26-110. Steel Development Plan. Part II. Raw Materials. R. W. Shone. *Iron and Steel*, v. 20, July 1947, p. 358-361, 364.
Britain's plan for nationalized industry.

26-111. Expect Sheet Steel Shortage to Extend Until June 1948. Harold A. Knight. *Materials & Methods*, v. 26, July 1947, p. 67-69.
Results of a survey of sheet steel producers and representative users.

26-112. United States Not Becoming a "Have-Not" Nation in Essential Minerals and Metals. Howard I. Young. *Metals*, v. 18, July 1947, p. 6-9.
Continuation of good metal prices and sufficient manpower will enable industry to supply domestic metal requirements.

26-113. United States Faces Major Deficiencies in Many Essential Minerals and Metals. E. W. Pehrson. *Metals*, v. 18, July 1947, p. 10-12.
Deficiencies offer no serious threat to peacetime security of nation but represent dangerous defects in national defense.

26-114. Market Outlook for Zinc Die Castings. David Laine. *Metals*, v. 18, July 1947, p. 16-17, 19.
High production speed and low unit cost assure active demand; supply of 99.99% zinc a determining factor.

26-115. The Outlook for Die Castings. *Modern Metals*, v. 3, July 1947, p. 28.
Trends; sales of aluminum, zinc and others charted; prospect for magnesium.

26-116. Good Prospects for Indian Wire Industry. *Wire Industry*, v. 14, July 1947, p. 371, 387.
Calcutta correspondent reviews present status and future prospects. Comparative statistics.

26-117. The Nonferrous Foundry Industry—Its Structure, Sales, Costs, and Profits. Joseph B. Meier and Virginia H. McClung. *Foundry*, v. 75, Aug. 1947, p. 88-90, 156, 158, 160, 162, 164, 166.
Second of three articles based on statistics collected by the O.P.A. considers sales of rough nonferrous castings over the period 1940-1946. Does not include companies specializing in railway journal bearings or ship propellers.

26-118. Foundries in United States and Canada. *Foundry*, v. 75, Aug. 1947, p. 75, 184, 186.
Distribution of foundries in the different states and provinces by types. Comparative data for 1945.

26-119. Establishing a Normal Operation in a Gray Iron Jobbing Foundry. Albert E. Grover. *Foundry*, v. 75, Aug. 1947, p. 92-93, 172, 174.
Costing principles.

26-120. The Aluminum Cartels. Robert L. Bishop. *Mechanical Engineering*, v. 69, Aug. 1947, p. 663-665.
An extensive and highly critical review of a recent book, "The Aluminum Cartel," by Louis Marlio of the Brookings Institution, Washington. Mr. Bishop believes that the aluminum cartel was more harmful to the public interest than does Mr. Marlio.

26-121. Short and Long-Term Steel Outlook. H. B. McCoy. *Stove Builder*, v. 12, Aug. 1947, p. 38-43, 106.
A statement by the Director of the Office of Domestic Commerce, Department of Commerce, before a Senate subcommittee.

26-122. Copper Resources of the United States. Benjamin Moulton. *Scientific Monthly*, v. 65, Aug. 1947, p. 143-147.
A brief analysis showing production of over 20 years, and reserves.

26-123. Oglebay Norton to Build Taconite Beneficiation Plant. Bill Lloyd. *Iron Age*, v. 160, Aug. 14, 1947, p. 110-112.
Proposed development and future prospects. Flowsheet for 2,500,000-ton per yr. plant.

26-124. Major Stumbling Blocks Seen for Argentine Steel Industry. Gene Hardy. *Iron Age*, v. 160, Aug. 14, 1947, p. 115.
Plans of Argentine government. Major stumbling blocks are lack of domestic sources of iron ore and fuel.

26-125. Swiss Machine Tool Industry Expands for Export Trade. Norman Stubbs. *American Machinist*, v. 91, Aug. 14, 1947, p. 136-137.
Wide expansion of Swiss industry during and since the war. Shortages still existing. Types of machines being made and statistics on plants and exports.

Section 26. For additional annotations indexed in other sections, see:
10-148; 25-109; 27-152-162.

27 NEW BOOKS

27-152. Metal Statistics, 1947. Fortieth Annual Edition. 816 p. American Metal Market, 18 Cliff St., New York, N. Y. $2.00.
An annual volume of price and production statistics. Most prices are based on quotations published in *American Metal Market*.

27-153. Structural Analysis. W. Fisher Cassie. 260 p. Longmans, Green and Co., 55 Fifth Ave., New York 3, N. Y. 16s.
Assumes an understanding of the theory of statically indeterminate structures and concentrates on numerical problems.

27-154. S.A.E. Handbook, 1947. 822 p. Society of Automotive Engineers, Inc., 29 W. 39th Street, New York City, N. Y. $10.00 to nonmembers.
New data on hydraulic brake fluids, standards for involute serrated shafts, three types of crankcase oil, standards for pipe, filler and lubrication fittings, specifications for automotive steel castings, and general information on welding electrodes and copper and silver brazing, in addition to material revised from previous editions.

27-155. Rules for Construction of Power Boilers. Sections 1 and 6, and Appendix, A.S.M.E. Boiler Construction Code. 250 p. 1947. American Society of Mechanical Engineers, 29 W. 39th St., New York, N. Y.
Code adopted by A.S.M.E.

27-156. Rules for Construction of Unfired Pressure Vessels. Section 8, A.S.M.E. Boiler Construction Code. 182 p. American Society of Mechanical Engineers, 29 W. 39th St., New York, N. Y.
Code adopted by the A.S.M.E.

27-157. Index to the Literature on Spectrochemical Analysis: Part II, 1940-1945. Bourdon F. Scribner and William F. Meggers. 180 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.
1032 abstracted references arranged alphabetically by author within each of the years included. Most of the

abstracts are quoted from *Chemical Abstracts*.

27-158. American Society for Testing Materials Proceedings, 1947. Volume 46. 1629 p. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Committee reports on ferrous and nonferrous metals, cementitious, concrete and masonry materials; miscellaneous subjects. Papers and symposiums on atmospheric weathering of corrosion resistant steels; fatigue; testing of parts and assemblies; testing of bearings; materials for gas turbines; metals; spectroscopic light sources; atmospheric exposure tests on nonferrous metals; statistical control in its application to specification requirements; and miscellaneous subjects. (This material has appeared previously in preprint or pamphlet form, or in *ASTM Bulletin*.)

27-159. Proceedings of the Institute of British Foundrymen. Volume 39. 325 p. 1945-1946. Institute of British Foundrymen, Saint John Street Chambers, Deansgate, Manchester, England.

Annual reports. Also castings and weldings, by Sir Claude D. Gibb. Control tests for gray cast iron. Fluidity testing of foundry alloys, by K. L. Clark. Standard test bars for the nonferrous foundry, by Frank Hudson. The influence of raw material on the properties of white-heart malleable cast iron with special reference to the influence of residual elements. Annealing rate in gaseous malleablizing, by D. M. Dovey and I. Jenkins. Notes on the process of gaseous malleablizing with especial reference to the use of steam, by D. M. Dovey. Some notes on hard wear resisting cast irons and steels, by Marcel Ballay and Raymond Chavy. The production of "grand slam" bomb castings, by Basil Gray. Hot blast cupola design, by E. Longden. Experiences with balanced air feed in the cupola, by T. H. Taft and H. A. Hallett. Heat treatment of gray cast iron for relief of internal stresses, by P. A. Russell. Determination of gas content of sand cores. Second report on the basic cupola. Sand supply to molding machines from overhead hoppers, by N. C. Blythe. Duplex pump castings, by R. H. Brown. Mass production of tank wheels in black-heart malleable, by A. B. Bill and J. Peers. Inspection in a mechanized foundry, by P. Cook. Cupola operation, by D. H. Young. The technological principles of casting design, by Victor M. Shestopal. Specification, design and production of iron castings for vitreous enameling, by John W. Gardom. Temperature measurement by means of immersion pyrometer, by E. Hunter, A. R. Parkes and J. W. Dews. The application of ethyl silicate to foundry practice, by Clifford Shaw. Some initial results on the influence of tellurium as a chill-inducing medium in cast iron, by A. N. Sumner. The formation of banded structures in horizontal centrifugal castings, by H. O. Howson. Also accompanying discussion.

27-160. Metal Industries Catalog, Fifth Edition. 551 p. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y.

Alphabetical index; trade name index; equipment and materials classified index; engineering and metallurgical data section; manufacturers' catalogs; technical and scientific books.

27-161. Hard Surfacing by Fusion Welding. Howard S. Avery. 100 p. American Brake Shoe Co., New York, N. Y.

First of a series of monographs covers: economic advantages; hardness testing; abrasion and impact testing; galling; properties of the various materials used for hard surfacing; hard surfacing techniques; use of hard metal inserts; and applications. 40 ref. (To be published as a portion of text, "Engineering Laminates", Albert G. H. Dietz, editor.)

27-162. Minerals Yearbook. 1947. H. D. Keiser. 1689 p. United States Government Printing Office, Washington 25, D. C.

A general summary, information concerning the various metals and nonmetals in the form of articles by separate authors. Mine safety and foreign minerals.

27-163. Powder Metallurgy. Alexander Squire. U. S. Dept. of Commerce, Washington 25, D. C.

A collection of reports on wartime research from Watertown Arsenal Laboratory. (Reproduced by arrangement with the Office of Technical Services.)

27-164. Bibliography of Polarographic Literature: 1922-1945. 169 p. E. H. Sargent & Co., 155 to 165 E. Superior St., Chicago, Ill.

1078 references (no abstracts) and author and subject indexes.

27-165. Forming Alcoa Aluminum and Magnesium. 88 p. Aluminum Co. of America, Pittsburgh, Pa.

Properties and procedures found most satisfactory in commercial practice.

27-166. Transactions of American Society for Metals. Ray T. Bayless, Editor. V. 39, 1005 p. 1947. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Includes the following papers which have been preprinted and abstracted in that form in the 1946 *Metal Literature Review*, v. 3, in section and number as indicated. A Metallographic Etchant to Reveal Temper Brittleness in Steel, by J. B. Cohen, A. Hurlich, and M. Jacobson (4-106). Development of Temper Brittleness in Alloy Steels, by W. S. Pellini and B. R. Queneau (18-238). Practical Importance of Hydrogen in Metal-Arc Welding of Steel, by S. A. Herres (22-533). Measurement of Embrittlement During Chromium and Cadmium Electroplating and the Nature of Recovery of Plated Articles, by Carl A. Zapffe and M. Eleanor Haslem (8-128). The Development of a Turbosupercharger Bucket Alloy, by E. Epremián (3-214). The Stress Rupture and Creep Properties of Heat Resistant Gas Turbine Alloys, by Nicholas J. Grant (3-215). Changes in Austenitic Chromium-Nickel Steels During Exposures at 1100 to 1700° F., by Peter Payson and Charles H. Savage (4-107). The Tempering of High-Alloy Toolsteels, by George A. Roberts, Arthur H. Grobe, and Christian F. Moersch, Jr. (18-235). Constitution of the System Indium-Tin, by F. N. Rhines, W. M. Urquhart, and H. R. Hoge (4-104). Pole Figures of the Effect of Some Cold Rolling Mill Variables on Low-Carbon Steel, by John Karl Wood, Jr. (19-276). Stability of Austenite in Stainless Steels, by C. B. Post and W. S. Eberly (4-103). Quantitative Evaluation of Intergranular Corrosion of 18-8 Ti, by Freeman J. Phillips (6-121). Isothermal Transformation of Austenite, by Axel Hultgren (4-109). Also includes 23 other papers which are abstracted separately at this time.

27-167. Transactions of American Society for Metals. Ray T. Bayless, Editor. V. 38, 1022 p. 1947. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.00.

Contains the following papers which have been preprinted and abstracted in that form in 1946 *Metal Literature Review*, v. 3, in section and number as indicated. The Chromium-Oxygen Equilibrium in Liquid Iron, by Hsin-Min Chen and John Chipman (2-139). The Apparent Influence of Grain Size on the High-Temperature Properties of Austenitic Steels, by C. L. Clark and J. W. Freeman (3-216). Experimental Studies of Continuous Cooling Transformations, by C. A. Liedholm (4-108). The Interrupted Quench and Its Practical Aspects, by Howard E. Boyer (18-239). A Periodic Chart for Metallurgist, by Carl A. Zapffe (4-105). The Measured Knoop Hardness of Hard Substances and Factors Affecting Its Determination, by Newman W. Thibault and Helen L. Nyquist (9-134). The Effect of Manganese on the Properties of Cast Carbon and Carbon-Molybdenum Steels, by N. A. Ziegler, W. L. Meinhart, and J. R. Goldsmith (3-217). Relation of Quenching Rate and Hardenability to the Mechanical Properties of Several Heat Treated Cast Alloy Steels, by Charles R. Wilks, Howard S. Avery, and Earnshaw Cook (18-240). Hardness Testing of Metals and Alloys at Elevated Temperatures, by Frederick P. Bens (9-133). Influence of the Strain Rate and the Stress System on the Mechanical Properties of Copper, by D. J. McAdam, Jr., G. W. Geil, and D. H. Woodard (9-54). Formation and Transformation Studies of Iron Carbon Powder Alloys, by John F. Kahles (5-67). Carbon Concentration Control, by E. G. de Coriolis, O. E. Cullen, and Jack Huebler (18-237). Some Special Metallographic Techniques for Magnesium Alloys, by P. F. George (4-102). Plastic Deformational Analyses on Pure Magnesium, by Louis A. Carapella and William E. Shaw. The Effects of Microstructure on the Mechanical Properties of Steel, by J. H. Hollomon, L. D. Jaffe, D. E. McCarthy, and M. R. Norton (4-111). Factors Influencing the Pearlitic Microstructure of Annealed Hypoeutectoid Steel, by R. A. Grange (4-112). Also includes 15 other papers which are abstracted separately at this time.

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